A COMPREHENSIVE STUDY ON VARIOUS TREATMENT MODALITIES & ITS OUTCOME IN LIVER ABSCESS IN OUR INSTITUTION

A Dissertation Submitted To

The Tamilnadu Dr.M.G.R. Medical University

In partial fulfilment of the regulations for the award of the

M.S., DEGREE EXAMINATION

BRANCH-I GENERAL SURGERY

DEPARTMENT OF GENERAL SURGERY

GOVT. STANLEY MEDICAL COLLEGE & HOSPITAL

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

CHENNAI
APRIL 2017

CERTIFICATE

This is to certify that this dissertation on "**A COMPREHENSIVE STUDY ON VARIOUS TREATMENT MODALITIES AND ITS OUTCOME IN LIVER ABSCESS IN OUR INSTITUTION"** is a bonafide work done by Dr.T.Srinivasan, Post graduate student (2014- 2017) in the **Department Of General Surgery, Government Stanley Medical College & Hospital, Chennai** under my direct guidance and supervision, in partial fulfilment of the regulations of the The Tamilnadu Dr.M.G.R. Medical University, Chennai for the award of **M.S., Degree (**General Surgery) Branch-I, examination to be held in April 2017.

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DECLARATION

I, Dr SRINIVASAN T, solemnly declare that this dissertation titled **"A COMPREHENSIVE STUDY ON VARIOUS TREATMENT MODALITIES AND ITS OUTCOME IN LIVER ABSCESS IN OUR INSTITUTION",** is a bonafide work done by me, in the Department Of General Surgery, Government Stanley Medical College & Hospital, Chennai under the guidance and supervision of my unit chief

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Examination to be held in April 2017.

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Date : Dr.T.SRINIVASAN

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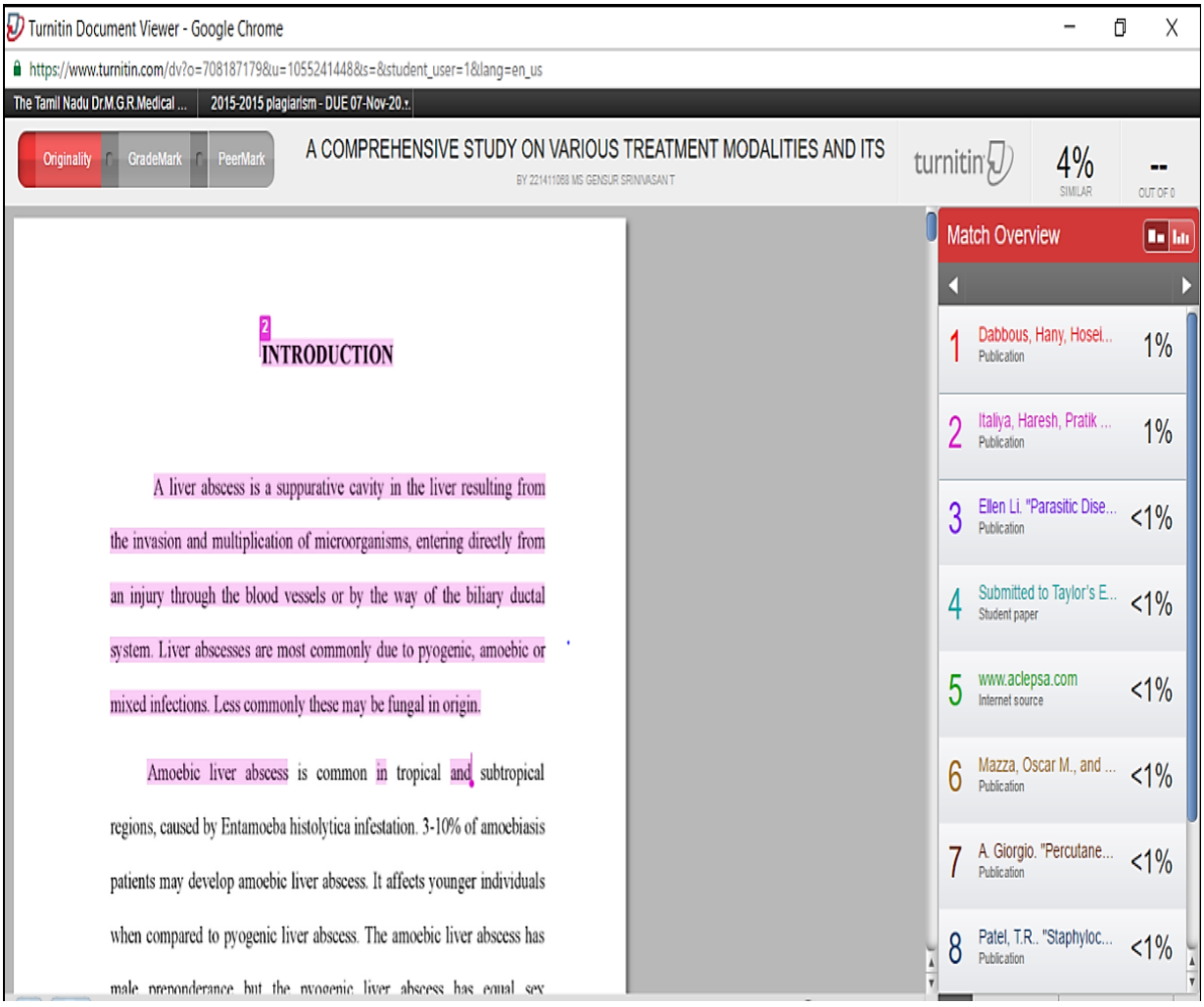
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INTRODUCTION
A liver abscess is a suppurative cavity in the liver resulting from the invasion and multiplication of microorganisms, entering directly from an injury through the blood vessels or by the way of the biliary ductal system. Liver abscesses are most commonly due to pyogenic, amoebic or mixed infections. Less commonly these may be fungal in origin.
Amoebic liver abscess is common in tropical and subtropical regions, caused by Entamoeba histolytica infestation. 3-10% of amoebiasis patients may develop amoebic liver abscess. It affects younger individuals when compared to pyogenic liver abscess. The amoebic liver abscess has male preponderance but the pyogenic liver abscess has equal sex
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Introduction

INTRODUCTION

A liver abscess is a suppurative cavity in the liver resulting from the invasion and multiplication of microorganisms, entering directly from an injury through the blood vessels or by the way of the biliary ductal system. Liver abscesses are most commonly due to pyogenic, amoebic or mixed infections. Less commonly these may be fungal in origin.

Amoebic liver abscess is common in tropical and subtropical regions, caused by Entamoeba histolytica infestation. 3-10% of amoebiasis patients may develop amoebic liver abscess. It affects younger individuals when compared to pyogenic liver abscess. The amoebic liver abscess has male preponderance but the pyogenic liver abscess has equal sex incidence.

Major portions of the reticuloendothelial system in the human body present in the liver, hence handles the continuous low level exposure to enteric bacteria. It is received through portal circulation. Non viral infections are unusual since high level reticuloendothelial cells in the liver.

Right lobe the liver is commonly affected due large volume and major blood supply. About 90% of the right lobe abscess are solitary and

about only 10% of the left lobe abscess are solitary. The abscess may follow the suppurative process anywhere in the body.

Pyogenic liver abscess are caused by bacteria. The infective foci arise from

a) biliary tract

b) portal circulation

c) haematogenous via hepatic artery

d) direct extension from intra abdominal regions

e) trauma.

Of these biliary pathology is the most common cause.

In amoebic liver abscess the most common symptom is abdominal pain. In pyogenic liver abscess fever is the most frequent symptom. Large abscesses are seen mainly in the amoebic liver abscess.

Ultrasonography is the main modality to diagnose the liver abscess. CT scan abdomen can detect even less than 0.5 cm abscess. Pus culture and sensitivity confirms pyogenic etiology. Serological tests are confirmatory to diagnose amoebic liver abscess.

In amoebic liver abscess, medical management is useful in most of the times. In pyogenic liver abscess the main treatment should be drainage method and antimicrobials.

Liver abscess treated by following methods :

1. Drugs alone.
2. USG Guided needle aspiration.
3. Percutaneous pigtail catheter drainage.
4. Laparoscopic drainage.
5. Open surgical drainage.

In this study 52 randomly selected cases are studied and mainly focused on the age distribution, type & site of the liver abscess, symptoms & signs, size & number of the abscess.

In this study the patients with abscess size more than 5 cm are treated with needle aspiration, percutaneous drainage, laparoscopic drainage methods & laprotomy. Outcomes are studied in these patients under the following criteria

- Duration of drainage
- Time for 50% reduction of the abscess cavity
- Duration of hospital stay
- Secondary procedure done
- Complications & follow up
- Recurrence

Aim Of The Study

AIM OF THE STUDY

1. To study about the clinical presentations, various treatment modalities of the patients diagnosed as liver abscess in our institution.

2. To identify the outcomes in terms of clinical improvement, duration of hospital stay & recurrence.

3. To study about the morbidity & long term follow up.

PLACE OF STUDY:

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DURATION OF STUDY:

8months (February 2016 to September 2016)

Review Of Literature

REVIEW OF LITERATURE

ANATOMY OF THE LIVER:

Among the abdominal viscera liver is the largest organ occupying the right hypochondrium and the epigastric region. The liver involved in all metabolic activities which are involved in homeostasis, nutrition and immune mechanism. It removes toxic materials in the body and regulates blood glucose levels and lipid metabolism. The liver stores vitamins, iron and micronutrients.

It has superior, anterior, right, posterior and inferior surfaces. Grossly it is divided in to four lobes as right, left, quadrate, caudate lobes. Currently, the liver functionally divided in to eight segments based on Couinaud's proposal. The abscess location determines the therapeutic decisions for the method of drainage. Comparing the left lobe, right lobe is easier to drain percutaneously. Because the superior mesenteric vein preferentially drains in the right lobe of the liver. So the greater amount of the blood goes to the right lobe leads to abscess formation common in the right lobe.

AMOEBIC LIVER ABSCESS:

HISTORY:

Leish recognised the first amoebae in colonic lesions with dysentery

Twenty six tropical abscess were described in autopsy series with dysentery. Between the year 1849-1919, many species of amoeba found in the human beings were Entamoeba coli, Entameba gingivalis,, Iodamoeba butschlii, Entamoeba hartmani. In 1903, Schaudin named the species Entamoeba histolytica. The two distinct species identified which are morphologically indistinguishable- entamoeba histolytica and entamoeba dispar. Entamoeba dispar is the only pathogen associated with asymptomatic carrier state.

INCIDENCE:

Amoebiasis occurs globally but the incidence is highest at the tropical and subtropical areas. Sometimes those who are serologically positive for amoebiasis and stool culture shows positive result may not show clinical symptoms. Such asymptomatic patients are now thought to be due to Entamoeba dispar. Approximately, 10 percent of patients with intestinal amoebiasis are prone to develop amoebic liver abscess. Amoebic liver abscess due to heavy alcohol consumption in males, hormonal influence in women before menstruation and iron deficiency anemia protect from abscess in menstruating women.

EPIDEMIOLOGY:

It commonly affect males of age group 30 to 50 years. The reason behind this is due to alcohol induced hepatocellular damage produces nidus for seeding of infection from intestine through portal venous system. There is association of amoebic infection with poor sanitation, hot climate, lack of hygiene and overcrowded living conditions in lower socioeconomic groups of developing countries.

The infection transmitted mainly through fecal-oral route following contamination of food by flies, handling of the food after contamination if there is unhygienic practices are followed in the family . If human faeces are used as fertilizer it may contaminate the water and raw sewage and if the unclean water is used for freshening the food.

Amoebic liver abscess in developed countries occurs in travellers by E.Histolytica after stay of more than one month duration in endemic regions. Immuno compromised state due to HIV infection also increase the chance of amoebic liver abscess. Diseases where the cell mediated immunity is reduced also increase the disease occurrence. The common organism involved in homosexual amoebiasis is Entamoeba dispar in temperate climates.

RISK FACTORS:

- Alcoholism
- Malnutrition
- Immunocompromised states like steroids usage, AIDS
- Old age
- Malignancy
- Pregnancy
- Recent travel to tropical regions

HOST RESPONSE:

Trophozoites contain ribosomal, lysosomal, cytoplasmic materials and contents from trophozoite surface in subcellular fractions eliciting antibody response has been detected by antigenic determinents. In infected patients the organism is detected in feces, serum, and materials obtained from liver abscess.

Production of immunoglobulin G is the complex humoral immune response to amoebic infection. Immunoglobulin M also produced as an immune response. But the immunoglobulin E is not produced. Immune serum and immune globulin against amoebic infection have lytic effect on amoeba.

In human being, humoral immunity is active against amoebiasis prior to the invasive disease. Cell mediated immunity is active against the invasive amoebiasis. Following amoebic infection the antigen sensitize the T-lymphocytes and induce its proliferation produce lymphokines and activates the macrophages. Malnutrition and alcohol intake predispose the development of invasive amoebiasis. It is seen predominantly in male population.

HOST FACTORS:

Human beings are the major reservoir host. Transmission occurs interpersonally through flies and fecal contamination of water. The pathogen Entamoeba dispar is common in those who are Homosexuals. But the Entamoeba dispar is most common in female population, those who are menstruating are not prone for infection but the reason is not known.

Because of low iron and presence of protective IgA in the immature milk of lactating women the breast fed children are less commonly affected. The country liquor as it contains more iron it causes invasive amoebiasis frequently. Poor socio economic status and adults of young age group are commonly affected than elder individuals. The protective activity against liver abscess of menstruation is lost during pregnancy.

ENTAMOEBA HISTOLYTICA

Entamoeba histolytica (19) is a protozoan of anaerobic in nature. It infects human and primates.

It is a single celled parasite causes intestinal amoebiasis with severity range from asymptomatic to discomfort, diarrhoea, dysentery, liver abscess, amoebic encephalitis according to

1. Immunity of the patient
2. State of nutrition of the patient
3. Amount of infective dose
4. Potency of the infective agent

Only in some cases the infection is restricted to the intestinal lumen. The non invasive form is having nucleus and number of vesicles in the granular cytoplasm. Although the trophozoites are anaerobic they can survive in the environmental conditions of low oxygen tension. Under certain environments the trophozoites release their vacuoles and around - themselves secrete a chitinous wall and forms cysts. Each cyst become quadrinucleate after cell division and mature. These cysts are infective stage of the parasite and the cysts in the feces are viable for several days. The trophozoites are destroyed by stomach gastric juice and they will not alive outside the human host. The factors which stimulate the trophozoites

to become invasive are not known. Compared to non invasive trophozoites the invasive trophozoites are larger in size and diameter.

The pathogenicity may be increased when the bacterial disease is associated. To understand wide variation in the disease, the most promising advance is the association between the zymodemes and the pathogenicity. An immunofluorescent technique has been reported to distinguish non pathogenic and pathogenic forms. Light or electron microscopy cannot distinguish the non pathogenic and pathogenic forms.

The hallmark investigations for intestinal amoebiasis of invasive form are demonstration of the parasite in the stool, rectal mucosal scrapings, specimens containing trophozoites with ingested red cells. But the cysts and trophozoites present in the stool is not a confirmatory evidence of invasive disease.

MORPHOLOGY

TROPHOZOITE :

It has a diameter of 15-30 micrometers. The invasive forms are more active and have the diameter of 50 micro meter. It is uninucleate, facultative anaerobe and has a limiting membrane which contains double layer surrounded with external glycocalyx of 20-30 micrometer in diameter. The strains isolated from patients of 18 in various parts of the

world. Out of these, seven are pathogenic which are isolated from patients of mucosal ulceration and hepatic abscess. For mobility it has pseudopodes. Trophozoites has ability to multiply but are not infective and cysts will not multiply. Trophozoites are responsible for amoebic dysentery, hepatitis, encephalitis. It contains fine granular endoplasm with ingested red blood cells and contains one nucleus only.

CYST:

These are infective forms of diameter 8-10 micrometers with retractile wall. They have more than one nucleus. They are Quadrinucleate form, after ingestion they will become metacystic stage another nuclear division occur and forms eight uninucleate trophozoites and complete the life cycle. Cyst can survive in the faecal material lodged under the nail for 45 minutes and can survive for up to one month in the soil at 10^{o}C. Rough chemical and physical environment does not destroy the cysts, because the cysts are highly resistant to such situations. But they are rapidly destroyed by drying, iodine of 200 ppm, heat of greater than 68^{o}C. They are not killed by chlorination which is used for drinking water purification.

Definitive host is human. No intermediate host or vectors for Entamoeba histolytica.

LIFE CYCLE:

Infective cysts from infective person are released into water or food. They are ingested by another person. In the stomach they are resistant to low pH. Cysts are excysted by components of bile and bicarbonate in the small intestine. Released trophozoites are carried to the cecum and adherent to the mucosal epithelium of the cecum. Trophozoites multiply by binary fission asexually. Then stops multiplying and encystations occurs. These cysts are released in the faeces. Mixtures of trophozoites and cysts are released in the feces of symptomatic patients (dysentery).

PATHOPHYSIOLOGY:

Infection begins after ingestion of the quadrinucleate cyst of the Entamoeba histolytica following contamination of the food and water with the faecal material. The acidic pH in the stomach does not destroy the cyst and excystation happens in the small intestine in the environment of alkaline and neutral pH followed by release of trophozoite form of the pathogen.

The virulence factors leading the course of the disease process are a parasite protein in the surface Lectin, amoebapores and proteases especially cysteine. The surface galactose/N-acetylgalactosamine (GalNAc) lectin mediate the adhesion of the trophozoite to the colonic

walls. When it attaches to the glycoproteins present in the intestine forming persistant infection. It results in caspase activation, activation of caspase 3 in the apoptotic pathway involved in cell killing and formation of the abscess. The amoebapores which are small peptides released by trophozoites involved in the breaking up of the lipid bilayer of mucosal epithelium leads to destruction of the barrier function of the mucosa forms the portal of entry to the organism. Its pathogenicity is due to colloid osmotic lysis of the cell.

The cysteine proteases involved in the pathogenesis of extra cellular degradation and cell monolayer disruption. The invasion extends to submucosal layer spreads laterally forming ulcers which are Flask shaped.

PATHOGENICITY:

ENTAMOEBA CYSTS (in water, soil, food under moist conditions)

⇩

Ingestion of the cyst

⇩

Excystation occur in the lumen of the colon and forms trophozoites

⇩

Invades the intestinal mucosa

⇩

Multiplying in the margins of the ulcer

⇩

Enter through mesenteric venules

⇩

Through portal venous system causing Liver abscess

SITE OF THE ABSCESS AND ITS CONTENTS:

Because of the larger volume and receiving maximum amount of blood supply the right lobe of the liver is commonly involved (1,2,19,20). It affects the right lobe near the dome of the diaphragm. The amoebic liver abscesses are well defined lesions containing yellow brown fluid later it becomes orange brown colour anchovy sauce appearance (21,24). The fluid contains necrotic liver tissue and blood. It is odourless contains few or no neutrophils. The edge of the lesion contains necrotic material hepatocytes and inflammatory cells. In the aspirate no amoeba will be found, they are mostly present in the periphery of the abscess. There will be periportal lysis of hepatic cells (21).

Surrounding the abscess, the unaffected part of the liver shows hyperaemia and edema which explains the hepatomegaly (24). Infection of the gallbladder and bile ducts does not occur, because the bile kills the parasite. Scarring will not occur after healing of the abscess.

COMMUNUTY SCREENING PROCEDURES:

The procedures done for parasitologic protocol are (25)

1) The unfixed faecal samples which are unstained or stained with iodine examined microscopically

2) Ritche's fecal concentration of samples, fixed with formalin.

3) Polyvinyl alcohol fixed stools are fixed with trichrome staining

4) Robinson's in vitro cultures

5) Two stool antigen detecting tests for E.Histolytica and E.dispar.

6) Serological tests include enzyme immunoassay, indirect haemagglutination test and indirect immunofluorescence test.

7) To identify zymodeme, starch gel isoenzyme electrophoresis of the stool samples can be done.

IMMUNOLOGY AND VACCINE DEVELOPMENT (19) :

The immunological reactions for the organism is both humoral and cellular. Some components are in the immunological process limit the disease process and some may exacerbate the disease. Recurrence of the amoebic abscess is rare.

First line of defence against the parasite provided by innate immunity. Eventhough the complement is active against the parasite it cannot prevent the invasion of the E.histolytica, because the complement is absent in the gut mucosal secretions. Usually the initial host defence will be due to neutrophils, but the parasite kills these cells by producing a chemoattractant on contact.

The adoptive immunity is the second line of defense against E.Hitolytica. In this cell mediated immune response cytokines are produced (e.g interferon gamma, tumour necrosis factor alpha,and interleukin 4) these cells activate lymphocytes and macrophages.

The local immune response IgA and serum IgG by Lectin protein causes non invasive and invasive infection of E.Histolytica. Serm IgG response does not provide immunity against the infection, but active against the future invasive disease.

Acquired immunity against the parasite is due to mucosal immune response produced by amoebic antigens inducing the gut associated lymphoid tissue. These are considered to be primary vaccine candidates. The antibody response against the galactose lectin and protection against the amoebic liver abscess also reported. Codon optimized DNA vaccine against the galactose lectin subunit producing cellular immune response and serum antibodies are also reported.

The more sensitive and specific tests among these to distinguish E.Histolytica and E.Dispar are Robinson's test and zymodeme identification. The most recent test to detect few (<5) cysts in the stool sample is DNA based PCR technique. It is a rapid test to perform and differentiate E.Histolytica and E.dispar without precultivation. To detect accurately the epidemiology of the two species PCR is the reliable test.

CLINICAL PRESENTATION:

The onset of clinical symptoms are slow and are present for several days or weeks before the patient comes for medical attention. The presentation is insidious onset lasting for two or more weeks.

PAIN:

Right hypochondrial pain is common in liver abscess for one to two weeks. This pain is due to stretching of the liver capsule by the abscess(19).The pain may referred to, right side chest, right shoulder. The pain is dull aching and constant. Seen in 90-93% of the patients. In the left lobe abscess the pain is present in the epigastric region, precardial or retrosternal also it may be referred to left shoulder. If the abscess is present in the inferior aspect of the liver it may present as peritonitis of upper abdominal pathology.

FEVER:

Seen in 87-100% of patients(1). It is due to pyrogenic effect of necrosed liver cells. Fever is typically between 38^{o}C to 40^{o}C (1). Mostly seen in all patients.

RIGOR:

Seen in 36-69% (1) of cases associated with fever.

NAUSEA AND VOMITING :

Seen in 32-85% of cases (1).

WEIGHT LOSS:

Seen in 33-64% of cases. If symptoms are more than two weeks patient may present with significant weight loss (1).

DIARROHEA:

Seen in one third of the patients. Although the stool microscopy is negative in many cases, studies show 75% of the amoebic liver abscess patients are positive (19) for parasites in stool microscopic examination.

OTHER SYMPTOMS:

Anorexia and acute colitis.

PULMONARY :

Seen in 18-26% of the patients (1). Rupture of the abscess into the pleural cavity causes pleural effusion leads to cough and chest pain. During cough odourless brown coloured substance expectorated similar to anchovy paste. Reason being bronchopleural fistula. It is nothing, but acellular proteinaceous debris consisting of necrotic hepatocytes.

SIGNS

ON GENERAL EXAMINATION:

Most of the patients are ill health with sweating, anaemic and toxic. There will be pain during movements. Some of the patients are asymptomatic or may be only associated with fever.

ABDOMINAL TENDERNESS:

It is in the right upper abdominal quadrant .Seen in 55-75% of the cases(1). In case of abscess in the left lobe pain will be present in about 28% of the patients. On percussion there is dullness over the right hypochondrium and can detect the vertical dimension of the liver.

HEPATOMEGALY:

This is generalised soft hepatomegaly sometimes with tenderness. May be accompanied with overlying muscle guarding and inter costal tenderness, warmthness and cutaneous edema. The usual differential diagnosis are acute cholecystitis, hepatitis, pyogenic liver abscess. In the situation of atypical presentation it may be confused with simple cyst of the liver, hydatid cyst, hepatocellular carcinoma.

JAUNDICE:

It is rare. If it is present it indicates the disease is severe. In case of large abscess and multiple abscesses and abscess in the inferior aspect of the liver they may compress the common bile duct causes jaundice. Seen in 5% to 8% of the cases (2).

DULLNESS AND RALES:

In the right lung base, breath sounds are decreased. Pleural rub may be present. In case of abscess in the left lobe of the liver there may be pericardial rub.

COMPLICATIONS

Communication of the abscess occur in the adjacent structures like peritoneal cavity, viscera, large vessels, the pleura, bronchi, lungs and the pericardium.

PERITONITIS:

Peritonitis associated with amoebiasis may be due to rupture of the abscess or due to perforation or necrotizing amoebic colitis. The area of contamination is confined to the adherence of the liver abscess to the anterior abdominal wall, diaphragm, omentum and bowel. Rupture into hollow viscus such as stomach and colon may occur in this situation.

Sudden bloody diarrhoea develops following rupture into the colon. Haematemesis seen in situations like rupture into stomach. Rupture into the peritoneal cavity causes peritonitis present as guarding and rigidity and absent bowel sounds.

PERICARDIAL INVOLVEMENT

The left lobe liver abscess is more prone to rupture into the pericardial cavity causes asymptomatic pericardial effusion to cardiac tamponade.

PLEUROPULMONARY COMPLICATIONS:

Rupture of the abscess into the pleural cavity and the bronchial tree causes pleural effusion. Clinical presentation will be dry cough and dyspnoea which increase the right hypochondrial pain. This rupture of the abscess into the pleural cavity occurs suddenly and rapidly causes collapse of the right lung and fill the right pleural space.

Rupture of the abscess into the bronchial tree causes sudden cough with expectoration containing copious amount of chocolate coloured sputum. Although it is a complication of the liver abscess it has the beneficial effect due to the abscess drained itself.

PULMONARY AMOEBIASIS :

Amoebic abscess of the lungs divided into Primary and Secondary. Primary lung abscess is rare and it is due to infection from intestine through portal vein into pulmonary capillaries. It causes lung abscess independent of liver abscess. Secondary lung abscess occur from liver by direct extension through diaphragm.

CEREBRAL AMOEBIASIS :

It presents as a complication of liver or lung abscess. It affects one of the hemispheres.

CUTANEOUS AMOEBIASIS:

Adjoining skin is invaded and causes extensive necrosis and slough will be formed due to the trophozoites of Entamoeba histolytica.

SPLENIC ABSCESS:

It is associated with hepatic abscess by direct extension from splenic flexure.

INVESTIGATIONS:

CONVENTIONAL LABORATORY TESTS

COMPLETE BLOOD COUNT:

Blood haemoglobin levels are less than 12g/dl, most of the blood picture is normocytic normochromic. Even though there is adequate iron storage, sometimes hypochromic blood picture may exist.(1,19)

Usually neutrophilic leukocytosis will be present. The cell count is 10,000-20,000/microlitre. Some times leukemoid reactions can occur in some cases. Eosinophil count will be normal (4).

Erythrocyte sedimentation rate may be elevated.

LIVER FUNCTION TEST :

In acute amoebic liver abscess there will be elevated aspartate aminotransaminase (AST) with normal Alkaline phosphatase. In case of chronic amoebic liver abscess increased value of alkaline phosphatase and normal value of aspartate aminotransaminases (21). There is decreased serum albumin level. The bilirubin level may or may not be elevated.

If it is elevated it shows the disease is severe. The most important test is elevated prothrombin time. (25)

IMAGING STUDIES

CHEST X-RAY :

PA view shows elevated right hemi diaphragm seen in 60% of the cases(19). It is usually associated with blunting of the right costophrenic angle due to pleural effusion, atelectasis of the right lower lobe also due to pneumonia.

ABDOMINAL X-RAY:

Thumb printing in the colon. If there is gas in the abdominal cavity due to hollow viscus perforation or prior percutaneous intervention can be diagnosed (21).

ULTRASONOGRAPHY:

Amoebic liver abscess present as solitary sub capsular lesions. These lesions appear in the ultrasound in early stages as hyper echoic lesions than adjacent parenchyma. After the necrosis, the abscess core turned into echo lucent with posterior acoustic shadow. The advantages are quick, safe, economical and easily repeatable, with diagnostic accuracy of 90% (2). Many cases can be easily managed with ultrasound alone. It is first line disease specific investigation of choice.

The typical findings of hepatic abscess seen in the ultrasound are (21)

1) It can detect the location, size, number of the abscess
2) A round or oval shape
3) The wall echoes are lacking
4) Hypo echogenicity compared with normal liver and the diffuse echogenicity of the abscess
5) The location is usually periphery and
6) The distal sonic enhancement.
7) Used as a guide for percutaneous aspiration of the abscess. Sometimes hepatocellular carcinoma and metastatic carcinoma may be confused with the liver abscess because of their hypoechogenisity.

   It is an ideal tool for the follow up of the patients after management.

CT SCAN (1,21,25) :

CT Scanning can detect smaller lesions in comparing with ultrasound is the major advantage. It is a second line investigation and is reserved for patients when ultrasound is not diagnostic. It is useful in atypical or chronic abscess cases. CT Scanning shows better enhancement of the rim in pyogenic liver abscess and in necrotic liver tumour. In acute liver abscess cases, it does not show any better accuracy than ultrasound.

It shows abscess as round hypodense lesions which are well defined and have homogenous structure. It localises the lesion precisely and shows its extent. The disadvantage is more expense and have ionizing radiation.

MAGNETIC RESONANCE IMAGING:

This is not superior to CT Scan in the diagnosis of liver abscess. It is mainly used for the follow up of treated patients and to differentiate the abscess from neoplasm in the liver. In untreated patients on T1 weighted MRI images the abscess cavity appear as hypodense lesions, in T2 weighted images the abscess cavity appear as hyperdense lesions (15). In the abscess margin there will be incomplete ring of hyperdensity. After treatment, the cavity in MRI imaging appear as homogenous complete concentric rings due to fibrosis and hemosiderin deposits in the peri abscess region. After four days of treatment, reparative changes will be seen. It indicates the response is good.

Concentric rings seen in the imaging after successful treatment corresponds to an inflamed granulation tissue is the inner margin, the type 1 collagen represents the next ring, the outer margin corresponds to the atrophic or mildly inflamed liver parenchyma became prominent on T1 and T2 weighted images. The T2 weighted images shows perifocal edema and resolution. Even though these findings are present the pyogenic liver abscess, hematomas and necrotic liver tumours have same features .

Ultra Sound Imaging – Liver Abscess

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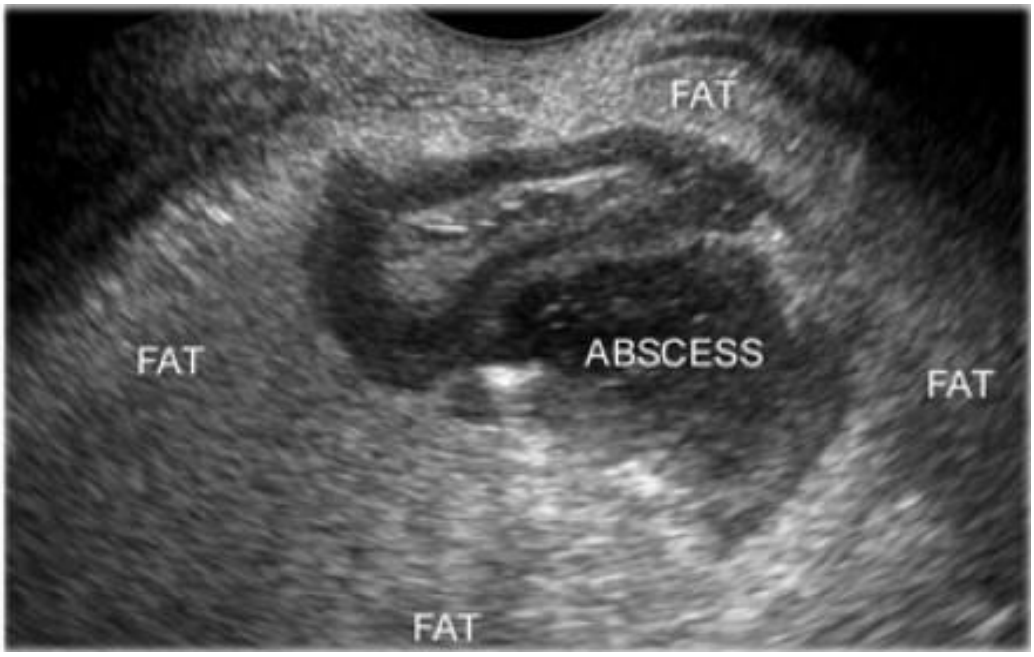

CT Scan Abdomen – Liver Abscess

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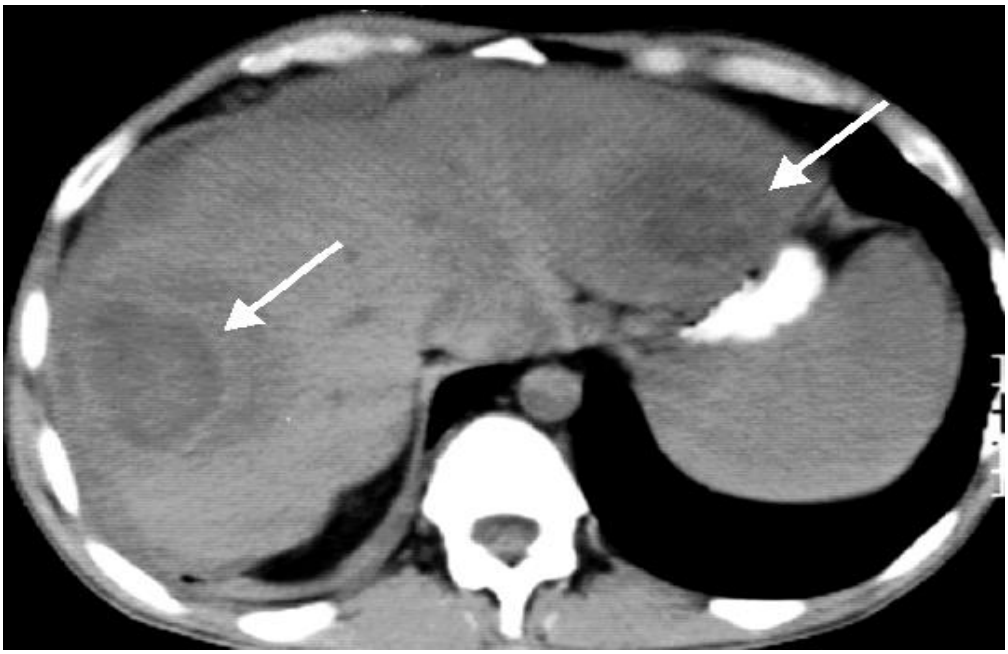

LIVER SCAN:

Gallium citrate and technetium labelled sulphur colloid radio nucleotide liver scan exhibit ‘cold’ spots for amoebic liver abscess and ‘warm’spots for pyogenic liver abscess (25). Treated lesions persist as cystic appearing lesions, becomes anechoic and calcified. Complete radiological resolution occurs after two years or more. Sensitivity >90% .

STOOL EXAMINATION (1,19)**:**

Amoeba in the stool is the confirmatory evidence that the liver abscess is due to amoebiasis. Only 10% to 40% of the patients show positive microscopic stool examination in case of the amoebic liver abscess. It is due to the test may be complicated by the use of laxatives, barium, antibiotics and soap water enema. The most efficient method for obtaining the specimen for examination is biopsy or scrapping from the rectal mucosa during sigmoidoscopy. But the stool examination does not distinguish E. Histolytica from E. Dispar microscopically. In this situation the Enzyme Linked Immunosorbant Assay (ELISA) useful to diagnose E.Hitolytica antigens and can differentiate them using stool polymerase chain reaction. But the stool examination does not prove or exclude the hepatic amoebiasis and invasive disease.

DIAGNOSTIC ASPIRATION:

It can be done as ultrasound or CT guided needle aspiration. This test is not routinely done.

Therapeutic aspiration is done in following situations (2) :

1. In case of inconclusive, delayed or unavailable amoebic serology and the differential diagnosis is mainly pyogenic liver abscess
2. In case of suspicious secondary infection of the liver abscess
3. A therapeutic trial with anti amoebic drugs is inappropriate, as in pregnancy
4. If fever and pain persist for more than 3-5 days even after appropriate therapy, may be benefited by aspiration and gives symptomatic relief.
5. If the abscess is extremely large, rupture is to be suspected especially pericardial rupture in left lobe liver abscess.

SEROLOGICAL INVESTIGATIONS

The serological tests for amoebic infection are highly sensitive and specific. This test can differentiate the pyogenic and amoebic liver abscess. These tests can also identify circulating amoeba antibodies.

The serological tests used are (1,19,21)

1. Indirect haemaglutination test (IHA)
2. Counterimmunoelectrophorosis
3. Complement fixation
4. Immunodiffusion
5. Enzyme linked immunosorbent assay(ELISA)

In all the invasive infection of the amoebiasis and most of the cases of amoebic dysentery are positive for the tests.

The Indirect Haemagglutination test is widely available and highly sensitive. The usual serological titre will be 1:512.

The cheap and sensitive technique widely used for serodiagnosis and sero epidemiological study is the ELISA.

About 90-95% of the patients are positive for antiamoebic antibodies (2) which are detectable after 7 days of infection. If it is positive in endemic areas, carefully the case to be investigated because about 35% of the patients who are uninfected may have detectable antibodies. But the negative serology excludes the disease. In non endemic areas, if the test is positive it denotes the disease is confirmed.

TREATMENT

Based on epidemiology, clinical features, imaging studies the diagnosis can be made and the empirical therapy can be started before the confirmatory diagnostic test results come.

CONSERVATIVE LINE OF MANAGEMENT (20):

Tissue amoebicides :

(i)For both intestinal and extra intestinal amoebiasis

Nitroimidazoles: Metronidazole, Tinidazole, Secnidazole, Ornidazole, Satranidazole.

Alkaloids : Emetine,Dehydroemetine.

(ii)For extraintestinal amoebiasis only

Chloroquine

Luminal Amoebicides:

Amide: Diloxanide furoate, Nitazoxanide

8-Hydroxyquinolines: Quiniodochlor (iodochlorohydroxyqiun, cilioquinol), Diiodohydroxyquin (iodoquinol)

Antibiotics: Tetracyclines ,Paramomycin

Of which the most commonly used amoebicides are Metronidazoles.

METRONIDAZOLE (20):

It has broad spectrum bactericidal activity against protozoa. Metronidazole does not affect aerobic bacteria. They are selectively toxic to anaerobic bacteria. After entering into the cell by diffusion its nitro group is reduced and forms redox proteins are effective only in anaerobic microbes to highly reactive nitro radical which exerts cytotoxicity. It will inhibit cell mediated immunity also. It is metabolised mainly in the liver primarily by oxidation and glucuronide conjugation and excreted in the urine.

Adverse effects :

Anorexia, nausea, metallic taste and abdominal cramps are most common. Transient neutropenia. In association with alcohol in can cause disulfiram-like reactions.

Dosage :

For invasive dysentery and Liver abscess – 800 mg tds for 7-10 days. Cure rate for metronidazole is 90%. No drug resistance has reported in Entamoeba histolytica. In case of slow response and relapse, the course of therapy can be prolonged. Therapeutic aspiration can be combined with prolonged drug therapy.

EMETINE AND DEHYDRO EMETINE:

It is oldest and most powerful drug active against amoebic infection. It can be given through intramuscularly and subcutaneously. This drug is excreted through kidneys. The mechanism of action is inhibiting the protein synthesis. The dose is 1 mg/kg/day for ten days. The most serious adverse effect of this drug is cardiotoxicity.

CHLOROQUINE:

This is an antimalarial drug, 4 aminoquinoline. It acts by binding with deoxy ribonucleic acid of the parasite. It has half life of one week mainly it excreted through kidneys. The usual dose is 1g/day for two days followed by 500 mg/day for twenty days.

Luminal amoebicides:

Following invasive amoebiasis, treatment to eliminate intraluminal cyst luminal agents should be given. Paramomycin 25 to 30 mg/kg per day orally in three divided doses for seven days. Diiodohydroxyquin 650 mg orally daily three times for twenty days to adults or Diloxanide furoate 500 mg oraly for ten days. The luminal agents are advised even if the stool microscopy is negative.

ULTRASOUND GUIDED NEEDLE ASPIRATION (8,15) :

It is done by using 16G or 18G needle. Widely used for if the abscess size is more than 5 cm. Along with drugs more rapid clinical response seen in the ultrasound guided aspiration of liver abscess, if the abscess are larger in size >5 cm without complications. It is a safe modality of treatment used for both diagnostic and therapeutic reasons. It is performed in strict aseptic precautions after sonographically identifying the abscess cavity 16 or 18 G needle is introduced and pus is aspirated. Repeat ultrasound should be done after three to five days and assess the size of the abscess, if it is not reducing repeat needle aspiration can be done. It can be repeated up to two times, if not reducing it indicates treatment failure and this group of patients are preferred for treatment under percutaneous catheter drainage or laparoscopic drainage. If the patients are treated by ultrasound guided aspiration the advantages are

- The recovery rate is increased
- Accelerate the resolution
- Complications less
- Scar will not be present

PERCUTANEOUS CATHETER DRAINAGE (10,11) :

This method is used when the abscess are large in size of > 5 cm. If the ultrasound guided needle aspiration is failed after two attempts percutaneous catheter drainage is preferred. Here the abscess cavity is assessed and 2% lignocaine is injected under sterile precautions. Needle is inserted and the site of abscess cavity is confirmed by aspirating the pus and a small incision is made and pigtail catheter is inserted the pus is drained and the catheter is fixed to the skin level. Daily the drain output is monitored. It is removed after the drain is nil. When compared to ultrasound guided needle aspiration this method is better for large abscess of size more than 5 cm.

LAPAROSCOPIC LIVER ABSCESS DRAINGE (2,13):

This method is an alternative option for percutaneous catheter drainage. It provides early recovery, minimal surgical site infection. Duration of hospital stay is reduced. It is cosmetically better than open drainage methods. Severely ill patients can also tolerate the laparoscopic drainage methods. The abscess wall is unroofed by electrocautery or harmonic scalpel. In percutaneous drainage method, large bore drain cannot be kept. Laparoscopically can place a large bore drain, it has the advantage to prevent failure of drainage and the resolution of the abscess cavity is faster.

Advantages

- Better localisation of the abscess
- Better access to difficult sites like dome of the liver and the left lobe of the liver.
- Vascular and biliary structure injuries are avoided
- Pleural spillage and pneumothorax can be prevented
- Diagnostic laparoscopy can be done in the same sitting and any intra abdominal pathology can be dealt
- Route of drainage can be planned
- Secondary infections are reduced when comparing open drainage methods.
- Soft large-bore tube drain for better drainage of residual viscid pus and necrotic debris
- Can place the large bore drains in the abscess cavity accurately.

Disadvantages:

- Due to the absence of tactile sensation breakdown of septations and perihepatic adhesions are difficult.

OPEN SURGICAL DRAINAGE METHOD:

This method is preferred in case of

- Rupture into peritoneal cavity causes peritonitis
- Rupture into pleural cavity
- Large abscess cannot be managed with percutaneous drainage methods
- Multiple loculated abscess in the left lobe of the liver
- When the diagnosis is in doubt

PREVENTION (19):

- **For personal prophylaxis:**
    - Use boiled drinking water
    - Food and drinks should be protected from contamination by flies, cockroaches and rats
    - Personal hygiene should be maintained.
- **For community prophylaxis:**
    - Effective sanitary disposal of faeces
    - Protection of water supply from faecal contamination
    - Detection and isolation of carriers

PYOGENIC LIVER ABSCESS

HISTORICAL ASPECTS (1,2,4)

Before the advent of the antibiotics, the appendicitis was the most common cause of the pyogenic liver abscess. The first documentation is ascribed by Waller, French physician in 1846 that the pyogenic liver abscess is secondary to appendicitis. He referred this condition as Le foie appendiculaire. The first successful treatment for pyogenic liver abscess with the use of antibiotic sulfanilamide with surgical drainage for multiple liver abscess was reported in 1938 by Oschner and collegues. They also reported that amoebic abscess is three times more common than pyogenic abscess (2). During the year 1947 anaerobic organisms were cultured and treated with penicillin. In the year 1953, McFadzean and colleagues treated pyogenic liver abscess with antibiotics and closed tube drainage method.

EPIDEMIOLOGY (19,4):

It has comparatively higher incidence in neonates those who have umbilical sepsis following umbilical vein catheterization. More than sixty years age group individuals are commonly affected due to biliary pathology. Immuno compromised state and trauma predispose liver abscess in adolescents and children. Furthermore, pyogenic liver has no gender, racial and geographic difference.

Previously, it was thought to be due to appendicitis causes portal pyemia and liver abscess. But now the trend has been changed, common etiology is due to biliary tract disease causing ascending cholangitis and liver abscess. The frequent cause of the liver abscess due to Streptococcus milleri and Escherichia coli.

ETIOLOGY (1):

BILIARY PATHOLOGY

BENIGN:

- Common bile duct stones
- Cholecystitis
- Anastamosis between biliary tract and bowel.

  e.g choledocho duodenostomy
- Biliary endoscopic procedures like ERCP
- Percutaneous biliary procedures

MALIGNANT:

- Periampullary carcinoma
- Gallbladder carcinoma
- Pancreatic malignancy
- Common bile duct malignancy

PORTAL ROUTE

BENIGN:

- Diverticular infection
- Anorectal abscess and other infections
- Pelvic inflammation
- Sepsis in the post operative period
- Perforative peritonitis
- Ulcerative colitis and crohn's disease
- Pancreatic abscess

MALIGNANT:

- Colonic malignancy
- Stomach malignancy

ARTERIAL ROUTE

- Endocarditis
- Valvular infection
- Ear, throat and nose infection
- Dental sepsis.

TRAUMATIC:

- Blunt and open abdominal injuries
- Chemoembolization
- Percutaneous ethanol injection.

PATHOPHYSIOLOGY (1,24,19):

In extrahepatic biliary obstruction by common bile duct stones, tumours and strictures causes ascending cholangitis which leads to abscess formation in the liver. Portal pyemia following intra abdominal infection causes liver abscess via portal circulation

Hematogenous infection via hepatic artery following systemic bacterial inection due to bacterial endocarditis, abuse of intra venous drugs and urinary sepsis. Trauma and laparoscopic cholecystectomy can cause liver necrosis and abscess formation following vascular injury.

Choledocho duodenostomy and choledocho jejunostomy can cause liver abscess. Recently, cryoablation and trans arterial embolization can also causes liver abscess.

RISK FACTORS (1):

- Inflammatory bowel disease. In Crohn's disease the mucosal barrier is destroyed, so more common than ulcerative colitis.
- Cirrhotic liver forms a nidus for infection
- In transplanted liver
- In hepatocellular carcinoma of the liver if hepatic artery embolization is done, it may predispose liver abscess.

- Immuno compromised states like diabetes mellitus, HIV infection.
- Elder age group
- Nutritional deficiency, malignancy, pregnancy, corticosteroid use, chronic alcoholism are the risk factors for liver abscess.

MICROBIOLOGY (1,7,19):

The pyogenic abscess is mostly polymicrobial. Enteric facultative anaerobic organisms are commonly involved in the pathogenesis. The potential pathogens are

- Streptococcus milleri or streptococcus anginosus are mainly involved in the causation of the pyogenic liver abscess.
- In case of patients who underwent transarterial embolization for hepatocellular carcinoma leads to liver abscess the pathogen identified are streptococcus aureus, streptococcus pyogenes.
- Liver abscess can occur following candida infection.
- Klebsiella pneumonia is isolated from liver abscess of diabetic patients in recent times.
- In tuberculous liver abscess, no organisms isolated
- In meloidosis liver abscess can occur, it is due to Burkholderia pseudomallei.

SPECTRUM OF MICRO ORGANISMS CAUSING PYOGENIC LIVER ABSCESS (25)

GRAM POSITIVE AEROBES

- Streptococcus milleri
- Staphylococcus aureus
- Enterococcus

GRAM NEGATIVE AEROBES

- Escherichia coli
- Klebsiella pneumonia
- Proteus
- Pseudomonas aeruginosa
- Enterobacter
- Citrobacter

GRAM NEGATIVE ANAEROBES

- Bacteroides
- Fusobacterium

GRAM POSITIVE ANAEROBES

- Clostridium

CLINICAL MANIFESTATIONS (1,20,25**):**

- Fever and abdominal pain are the common symptoms seen in the pyogenic liver abscess. Abdominal pain mainly in the right upper outer quadrant. In case of left lobe liver abscess pain may be present in the epigastric region.
- Chills
- Weight loss
- Nausea and vomiting
- Malaise
- Cough
- Referred pain to the right shoulder
- Pyrexia of unknown origin
- Loose stools
- Palpable liver with tenderness
- Reduced breath sounds in the right lung base, pleural rub may be present.
- Jaundice may be present in 25% of cases due to pre-existing biliary disease, large or multiple abscesses compressing the common bile duct.

INVESTIGATIONS:

BLOOD INVESTIGATION (1,2,4)

White blood cell count may be increased.
Because of the chronic pathology, anemia may supervene
Decreased serum albumin level. Elevated transaminase level may be seen. Diabetes mellitus may be associated with pyogenic liver abscess. So the blood sugar level should be monitored.

PLAIN X-RAY ABDOMEN AND CHEST :

It may show air or air fluid levels within the abscess cavity if the abscess is due to gas forming organisms (1,21).

ULTRASOUND ABDOMEN :

Initially the abscess cavity is hyper echoic. It appears as round ovoid elliptic lesions within the liver parenchyma. There will be irregular and echo poor margins. The abscesses are mostly hypo echoic and contain internal echoes of variable in number. If the abscess is due to gas forming organisms, the abscess cavity appear as hyper echoic lesions. Sensitivity range from 83-95% (1).

Liver abscess may present as single or multiple abscesses. A single abscess is cryptogenic. In case of biliary pathology, the abscess will be

multiple. In pyogenic liver abscess, if the abscess is less than 2cm in diameter described as microabscess (19). There will be two patterns of microabscess, one is diffuse military pattern which is seen in abscess of staphylococcal origin. The other pattern is cluster pattern which is associated with coliform and enteric organisms. In cholangitic abscess secondary to biliary obstruction, clustered abscesses occur and are multifocal in nature.

COMPUTED TOMOGRAPHY :

It has the advantage of able to detect the intra hepatic lesions of size even if less than 0.5 cm. The pyogenic abscesses are classified according to their size into microabscess (<2cm) and macro abscess (>2cm). Micro abscess appear as small low density lesions. Around a large abscess small daughter abscesses clustered to form multiple liver abscess. This cluster sign is suggeative of bacterial etiology.

SCINTIGRAPHY :

With technetium sulfur colloid, has sensitive to detect lesions more than 2cm in diameter, but smaller lesion may be missed. The advantage is the pyogenic liver abscess avidly take up the gallium (1).

CHOLANGIOGRAPHY (1):

To evaluate the patient with liver abscess both endoscopic cholangio pancreatography and percutaneous cholangio pancreatography are useful. It can identify the anatomy and biliary pathology to rule out ascending cholangitis. It also used to decompress the biliary system to relieve obstruction and ascending cholangitis.

MANAGEMENT

Abscess material should be obtained and gram staining to be done and the treatment should not be delayed even without culture and sensitivity. Related to the common organisms the antibiotics to be started. If the abscess is due to biliary pathology it will yield enteric gram negative pathogens. In case of colonic disorders, it yield anaerobic pathogens. Recently due to the emergence of many resistant bacteria imipenem, piperacillin tozabactum, ticarcillin clavulonate, ampicillin sulbactum have been recommented. The addition of metronidazole treats bacteroides. This is also used in the treatment of amoebic liver abscess.

Duration and route of administration of the antibiotic therapy individualized to the patient according to number of the abscess, underlying condition, toxicity of the drugs.

DRAINAGE PROCEDURES :

CLOSED ASPIRATION PERCUTANEOUS CATHETER DRAINAGE :

The first closed aspiration was described by McFadzean and colleagues in the year 1953. They treated the pyogenic liver abscess patients with closed needle aspiration and intracavitory antibiotics (1).
In percutaneous catheter drainage a pigtail catheter introduced into the abscess cavity and the pus is drained under ultrasound guidance.

In patients having Indwelling biliary stents with abscess should be treated with systemic antibiotics and stent change, with or without drainage. In cholangiography if the abscess is communicating with biliary tree, stent change only adequate. If no communication with biliary tract, the tract is small and the patient is septic abscess drainage is mandatory.

SURGICAL DRAINAGE:

Even though the percutaneous and aspiration techniques are developed, surgery also plays vital role in the management of liver abscess.

Currently the operations are done through transperitoneal approach and drainage of the abscess and correction of the intra-abdominal disorders. The incision is made in the midline or subcostally. Thorough

exploration of the abdomen is needed before further proceeding.

The pus should be aspirated and sent for culture and sensitivity. After identifying the abscess cavity, a tract is made through the liver parenchyma and the abscess should be drained in a dependent fashion. The purulent material should be sucked out. Then the abscess cavity has to be enlarged and the loculated cavities are explored. From the wall of the abscess cavity biopsies are taken to rule out tumour with necrosis and infection and to examine trophozoites of E. Histolytica. A drainage catheter should be kept in the cavity to drain the remaining pus. The catheters are brought out percutaneously through separate stab incision. These drains also used for irrigation, and contrast studies. The omental pedicles are kept in the abscess cavity to improve the blood supply.

COMPARISION BETWEEN AMOEBIC AND PYOGENIC LIVER ABSCESS (4) :

CREITERIA	AMOEBIC ABSCESS	PYOGENIC ABSCESS
AGE	30 – 50 years	>60 years
SEX	Males > Females	Equal
EPIDEMIOLOGY	Endemic regions low socioeconomic status, poor hygiene, Homosexuality	May be associated with liver fluke or round worm Infection
ETIOLOGY	E. Histolytica	Bacterial etiology
ASSOCIATED CONDITIONS	Rare	Biliary tract pathology, Tumours, diverticulitis, abdominal pathology
JAUNDICE	Rare	Common
COMPLICATIONS	Rupture into adjacent structures	Rupture,Msepsis
LIVER FUNCTION TESTS	Mild derangements. ALP elevated, Albumin reduced	Markedly abnormal Bilirubin, LDH, AST, Globulin are elevated, Albumin reduced
SEROLOGY	Positive	Negative
BLOOD CULTURE	Negative if not secondarily Infected	Positive
ABSCESS	Odourless thick fluid variable	Foul smelling pus, creamy
CONTENTS	in colour	Yellow
MEDICAL	Always effective	Often effective

Materials And Methods

MATERIALS AND METHODS

The relevant data shall be collected by using

- Detailed history
- Hematological investigations: complete hemogram, liver function test, serum proteins and albumin.
- Coagulation profile – PT ,aPTT, INR
- Blood culture & sensitivity
- Stool for ova & cyst
- Imaging studies : Xray chest , X ray abdomen erect
- USG abdomen & pelvis – to find echogenicity, site, number.
- CT abdomen & pelvis – to find exact location, size, number, extend (if needed)
- All the patients are treated with Inj. Metronidazole 500 mg iv tds for 7 – 10 days (minimum of 5 days)
- Then the patients are subjected to various treatment modalities like conservative management, USG guided

needle aspiration, USG guided pigtail catheter drainage, Laproscopic drainage & laparotomy

- Follow up USG abdomen after 5 days to look for decrease/ increase in abscess size, Recollection after needle aspiration.
- Another follow up USG abdomen done after 6 weeks to look for complete resolution of abscess cavity.

Outcomes are studied in terms of

- Age & Sex distribution
- Type & Size of abscess
- Symptoms & Signs
- Treatment Modalities
- Clinical improvement
- Time taken to 50% reduction in abscess cavity size
- Duration of drainage
- Duration of hospital stay
- Complications like infections, hemorrhage & rupture

- Secondary procedure
- Serial Follow up for complete resolution of abscess cavity

Patients were divided into five groups based on size of the abscess (i.e. Group I, II, III, IV, V)

- Group I was treated with Drugs alone
- Group II was treated with ultrasound guided needle aspiration along with drugs. Maximum of two times repeated aspiration was done.
- Group III was treated with pigtail catheter drainage along with drugs
- Group IV was treated with Laparoscopic drainage along with drugs
- Group V was treated with open surgical method along with drugs

Of these groups, Group I patients are belongs to the abscess cavity of size less than 5 cm. They are treated with drugs alone.

Group II, Group III, Group IV, Group V patients are belongs to the abscess cavity of size more than 5 cm and large abscess.

ADOPTED THERAPEUTIC PROTOCOL

1. MEDICAL :

All the patients included in the study are treated with drugs and additional drainage procedures except the Group I where they are treated only with drugs. The antibiotics was started without waiting for pus culture and sensitivity reports.

Invariably, Metronidazole 500mg intravenously three times daily, for minimum of five days given for all the patients. After collecting the reports the appropriate antibiotics were given. Follow up after 6 weeks done.

2. ULTRASOUND GUIDED NEEDLE ASPIRATION :

This drainage procedure was done for the patients whom abscess size is more than five centimetres. Followed by Inj. Metronidazole and antibiotics.

Method:

With the help of radiologists, under strict aseptic precaution using ultrasound the abscess cavity was localized and injection xylocaine 2% was infiltrated percutaneously. Trial aspiration was done using 16G or 18G needle. After complete aspiration, dressing was applied. The pus was sent for culture and sensitivity.

Following aspiration drugs was given for three days. If symptoms and signs are not reducing then repeat ultrasound abdomen was done and size of the abscess cavity and residual cavity was assessed. If it is increasing in size, second aspiration was done and drug therapy was continued.

The advantage of this procedure is patient does not require general anesthesia. The scar will not be present, infection rate is low.

The acceptability of the patient is poor in this method due to the procedure is painful and distressing, sometimes repeat aspiration may be needed.

3. PERCUTANEOUS PIGTAIL CATHETER DRAINAGE :

This method is adopted for the patients with abscess cavity of size more than 5 centimetres and large abscesses and for those who are not fit for general anaesthesia and in mainly right lobe liver abscess.

Method:

The abscess cavity is identified either using ultrasonogram or eliciting maximum point of tenderness. After localisation of the abscess, injection xylocaine 2% was infiltrated locally and trial aspiration was done. Then a small stab incision was made, by

using artery forceps the abdominal wall was pierced and entered into the abscess cavity. A pigtail catheter was introduced and all the pus are drained out. The catheter was fixed to the skin using non absorbable suture material (2-0 silk) and attached to a bag for continuous drainage of the pus.

This method is also does not require general anaesthesia. Major amount of the pus can be drained immediately after placing the catheter in to the abscess cavity. As the closed tube percutaneous drainage method is a crude technique it may cause rupture of the abscess into the peritoneal cavity leads to peritonitis. So care should be taken during the procedure.

After PCD being done

Pus was sent for culture and sensitivity. Empirically Injection Metronidazole and antibiotics were started and Daily drainage output chart was maintained. Daily dressing was applied. Infection of the wound was checked daily and managed.

Removal of PCD

If Quantity of discharge less than 10ml/ day for three days.

After reassessing the size of the cavity by ultrasonogram, PCD can be removed

USG guided needle aspiration

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Pig tail catheter drainage

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4. LAPAROSCOPIC DRAINAGE METHOD :

This modern technique of liver abscess is used for the abscess size is more than 5 cm, large abscess. If the percutaneous drainage methods and ultrasound guided aspirations methods are failed and before opening the abdomen for open drainage procedures, this method can be tried.

Method:

Under strict aseptic precaution, in general anaesthesia, a supra umbilical 10 mm port was created and carbon dioxide was inflated and pneumoperitoneum was created. Telescope was introduced. Two working ports were created one in the right hypochondrium another one in the left hypochondrium of size 5 mm. Thorough examination was done intra abdominal pathology ruled out. If any intra abdominal pathology was identified, it should be treated along with abscess drainage simultaneously. A wide bore abdominal drain tube or catheter was kept in the abscess cavity through one of the working ports and the drain brought out to the skin and was fixed with non absorbable suture material. The pus was sent for culture and sensitivity. If the abscess is loculated, it cannot be identified by laparoscopic instruments due to poor tactile sensation. After securing complete haemostasis the

pneumoperitoneum was deflated and the ports was closed with absorbable suture materials like Vicryl.

After laparoscopic drainage being done monitor:

- The Symptoms
- Quantity of the drainage
- Daily pus collection chart
- Infection of the port site.

Drain was removed after the collection is reduced below 10 ml for three consecutive days.

Repeat ultrasound being done after 3 days and the abscess cavity size is monitored.

5.OPEN DRAINAGE METHOD:

This method is used in the following situations:

(i) Rupture of the abscess into peritoneal cavity

(ii) Multiple abscesses and loculated abscesses

(iii) Inadequate response to percutaneous drainage

Under strict aseptic precautions, in general anaesthesia, in

supine position midline or subcostal incision was made and skin deepened in layers. Thorough laparotomy being done, intra abdominal pathology was looked for and managed. The abscess cavity was identified and the peritoneal cavity was covered with towel to prevent the spillage of the pus and catheter was placed in the cavity and brought out to the skin in a separate stab incision. The pus was let out and sent for culture and sensitivity. In case of ruptured abscess thorough peritoneal wash was given and pelvic drain was kept to prevent pelvic abscess. The laparotomy wound was closed with non absorbable suture material. Followed by anti amoebic and antimicrobials given. After the procedure being done following are monitored

- Daily pus collection chart
- Daily dressing to the wound
- Infection of the wound site

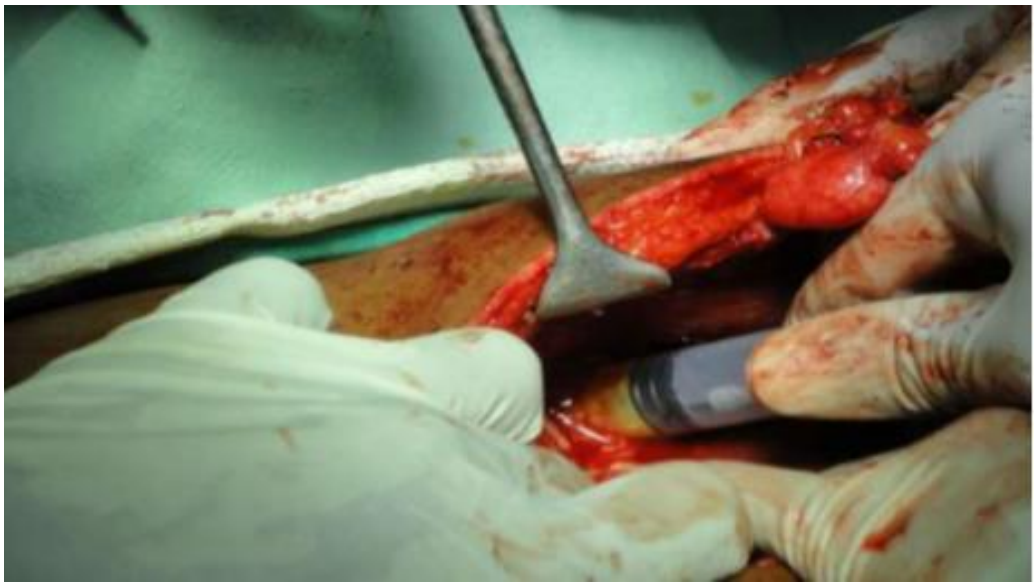
The abdominal sutures are removed on tenth day.

Drain was removed after the collection became less than 10ml/day

Laparotomy – open drainage

Mr. Kumar, 40/M, IP.NO- 1646721 , Gp V

Pus c/s



Master chart

S.NO	NAME	AGE / SEX	IP.NO	Rx GROUP	AMOEBIC	LOBE	ABSCESS		SIZE OF CAVITY			DURATION OF DRAIN	TIME FOR 50% REDUCTION				HOSPITAL STAY	SECONDARY PROCEDURE	COMPLICATION			FOLLOW UP	
							SINGLE	MULTIPLE	< 5 cm	5-10 cm	10-15 cm	(DAYS)	1-5 day	5-7 d	7-10 d	10-15 d	(DAYS)		IN	HR	RU	100% RESOLUTION	80% RESOLUTION
1	Balaji	44/M	1646163	GP I	NO	RT		YES	YES							YES	5	NIL	NO	NO	NO		YES
2	Mohan	32/M	1643045	GP V	NO	RT		YES		YES		7	YES				10	NIL	YES	NO	NO	YES	
3	Ananth	46/M	1642768	GP I	YES	BB		YES	YES							YES	6	NIL	NO	NO	NO		YES
4	Shanmugam	75/M	1639415	GP I	NO	RT		YES	YES							YES	18	NIL	YES	NO	NO		YES
5	Sethu	48/M	1637596	GP III	YES	RT	YES			YES		16			YES		19	NIL	YES	NO	NO		YES
6	Madhiyalagan	62/M	1634325	GP III	NO	RT		YES			YES	12				YES	30	NIL	YES	NO	YES		YES
7	Raja	43/M	1621314	GP III	YES	RT	YES			YES		7				YES	16	NIL	NO	NO	NO	YES	
8	Logu	45/M	1635990	GP III	YES	RT	YES			YES		13			YES		15	NIL	NO	NO	NO		YES
9	Chinnakattandi	55/M	1651475	GP V	YES	RT	YES				YES	6			YES		15	NIL	NO	NO	NO	YES	
10	Abdul hussain	54/M	1612342	GP I	YES	RT	YES		YES						YES		6	NIL	NIL	NO	NO		YES
11	Ravikumar	43/M	1657882	GP I	YES	RT	YES		YES						YES		7	NIL	NO	NO	NO		YES
12	Mohan	58/M	1657918	GP IV	NO	BB		YES		YES		5	YES				10	YES	NO	NO	NO	YES	
13	Kumar	40/M	1646721	GP V	NO	BB		YES			YES	6	YES				12	NIL	YES	NO	NO	YES	
14	Babu	32/M	1638842	GP I	YES	RT	YES		YES						YES		6	NIL	NO	NO	NO		YES
15	Krishnan	39/M	1654432	GP II	YES	RT	YES			YES			YES				10	YES	NO	YES	NO		YES
16	Gopal	37/M	1645645	GP II	NO	RT		YES		YES				YES			11	YES	NO	NO	YES		YES
17	Kaliyyanan	39/M	1632544	GP II	YES	RT	YES			YES			YES				8	NIL	NO	NO	NO	YES	
18	Banumathi	42/F	1645765	GP II	YES	RT	YES		YES				YES				9	NIL	NO	NO	NO		YES

19	Ramu	35/M	1654342	GP III	NO	BB		YES		YES		8		YES			12	NIL	NO	NO	NO	YES	
20	Baskar	28/M	1678654	GP III	YES	RT	YES			YES		7		YES			10	NIL	NO	NO	NO		YES
21	Govindaraj	38/M	1654763	GP III	NO	RT		YES		YES		8			YES		10	NIL	NO	NO	NO	YES	
22	Sivaraj	37/M	1678632	GP I	YES	RT	YES		YES							YES	6	NIL	NO	NO	NO		YES
23	Kannan	39/M	1689231	GP I	YES	RT	YES		YES						YES		6	NIL	NO	NO	NO		YES
24	Kodeeswaran	55/M	1645370	GP II	YES	RT	YES			YES			YES				12	YES	NO	NO	NO		YES
25	Marimuthu	40/M	1675432	GP V	YES	LT		YES		YES		6		YES			12	NO	YES	NO	NO	YES	
26	Nagaraj	39/M	1645753	GP I	YES	LT	YES		YES					YES			10	YES	NO	NO	NO		YES
27	Valiyammal	39/F	1657863	GP I	YES	RT	YES		YES						YES		6	NIL	NO	NO	NO		YES
28	Shivakumar	48/M	1645908	GP III	NO	LT	NO			YES		8		YES			9	NIL	NO	NO	NO	YES	
29	Rajkumaran	26/M	1687654	GP III	NO	BB	YES			YES		8		YES			10	NIL	NO	NO	NO		YES
30	Kanniyappan	24/M	1654378	GP II	YES	RT	YES			YES					YES		9	NIL	NO	NO	NO		YES
31	Vimalraj	38/M	1654872	GP III	NO	RT		YES		YES		8			YES		9	NIL	NO	NO	NO		YES
32	Mahendran	62/M	1654786	GP III	YES	RT	YES			YES		7		YES			8	NIL	NO	NO	NO	YES	
33	Raman	29/M	1638934	GP I	YES	RT	YES		YES						YES		6	NIL	NO	NO	NO		YES
34	Somasundaram	41/M	1639600	GP III	YES	LT			YES						YES		9	NIL	NO	NO	NO	YES	
35	Thiruvikkraman	35/M	1689346	GP III	YES	RT		YES		YES		8		YES			10	NIL	NO	NO	NO		YES
36	Kailasam	39/M	1629098	GP III	YES	RT		YES		YES		8			YES		8	NIL	NO	NO	NO		YES

37	Nagendran	43/M	1634880	GP III	YES	RT	YES				YES	8			YES		9	NIL	NO	NO	NO		YES
38	Chidambaram	39/M	1677823	GP V	NO	LT		YES			YES	5	YES				13	NIL	NO	NO	NO	YES	
39	Abdullah	33/M	1630924	GP III	YES	RT		YES		YES		8		YES			9	NIL	NO	NO	NO	YES	
40	Kandappan	40/M	1634526	GP III	YES	RT	YES			YES		9		YES			10	NIL	NO	NO	NO		YES
41	Velammal	51/F	1690231	GP I	YES	RT	YES		YES						YES		5	NIL	NO	NO	NO		YES
42	Thiagu	38/M	1666490	GP III	YES	RT		YES		YES		8		YES			10	NIL	NO	NO	NO	YES	
43	Sundaram	40/M	1647231	GP II	YES	RT	YES			YES			YES				6	NIL	NO	NO	NO		YES
44	Chandran	36/M	1649802	GP III	YES	RT		YES			YES	9			YES		12	NIL	NO	NO	NO	YES	
45	Natchimuthu	39/M	1620911	GP III	YES	RT	YES			YES		8			YES		10	NIL	NO	NO	NO		YES
46	Samiyappan	27/M	1689345	GP II	NO	RT	YES			YES			YES				7	NIL	NO	NO	NO		YES
47	Balasubramani	39/M	1630976	GP III	YES	RT		YES			YES	10				YES	13	NIL	NO	NO	NO		YES
48	Durairaj	48/M	1600921	GP III	YES	RT	YES			YES		8			YES		10	NIL	NO	NO	NO		YES
49	Keasavan	27/M	1623415	GP III	YES	RT	YES				YES	9				YES	12	NIL	NO	NO	NO		YES
50	Moorthy	68/M	1673452	GP III	YES	RT		YES		YES		8		YES			10	NIL	NO	NO	NO	YES	
51	Mariyammal	38/F	1674093	GP III	YES	RT		YES		YES		7		YES			9	NIL	NO	NO	NO		YES
52	Sivanesan	37/M	1629031	GP III	YES	RT		YES			YES	8				YES	S	NIL	NO	NO	NO		YES

Key to master chart

ABBREVIATIONS

S.NO – SERIAL NUMBER

IP.NO – INPATIENT NUMBER

M – MALE

F – FEMALE

RT – RIGHT LOBE

LT – LEFT LOBE

BB – BOTH LOBES

Rx – TREATMENT

GP - GROUP

GP I – CONSERVATIVE

GP II - USG GUIDED ASPIRATION

GP III – PIG TAIL CATHETER DRAINAGE

GP IV - LAPROSCOPIC DRAINAGE

GP V – LAPROTOMY

CM - CENTIMETRES

D – DAYS

IN - INFECTION

HR – HAEMORRHAGE

RT – RUPTURE

Results

RESULTS

Table – 1

AGE DISTRIBUTION

AGE	NO	YES
20 - 30 yrs	3.8%	7.7%
31 - 40 yrs	13.5%	36.5%
41 - 50 yrs	3.8%	17.3%
Above 50 yrs	5.8%	11.5%

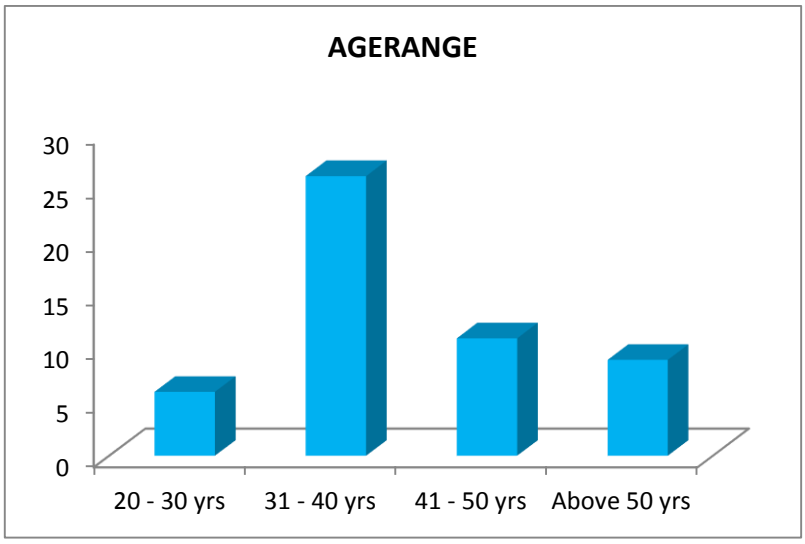


Table – 2

SEX DISTRIBUTION

SEX					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	4	7.7	7.7	7.7
	Male	48	92.3	92.3	100.0
	Total	52	100.0	100.0	

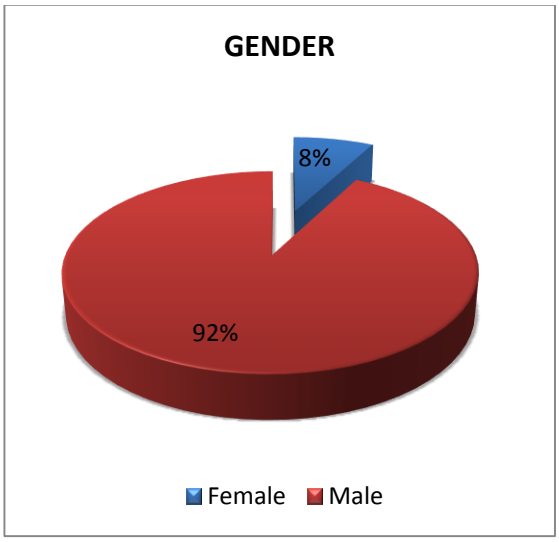


Table – 3

TREATMENT GROUP

Rx GROUP					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GP I	12	23.1	23.1	23.1
	GP II	8	15.4	15.4	38.5
	GP III	26	50.0	50.0	88.5
	GP IV	1	1.9	1.9	90.4
	GP V	5	9.6	9.6	100.0
	Total	52	100.0	100.0	

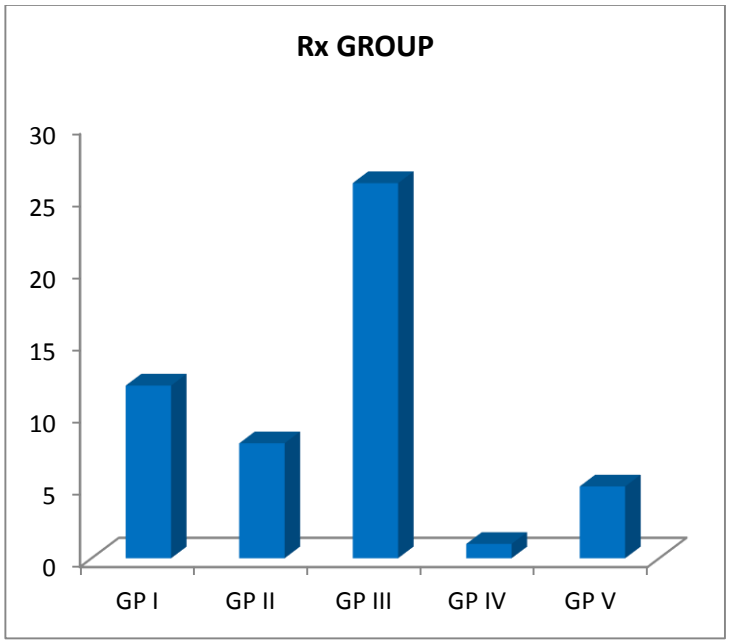


Table – 4

ABSCESS – AMOEBIC OR PYOGENIC

AMOEBIC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	14	26.9	26.9	26.9
	YES	38	73.1	73.1	100.0
	Total	52	100.0	100.0	

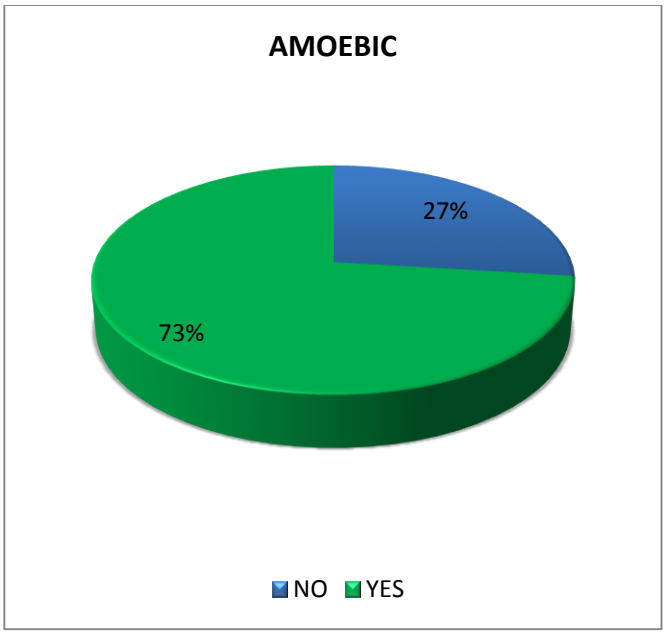


Table – 5

LOBE INVOLVEMENT

LOBE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BB	5	9.6	9.6	9.6
	LT	5	9.6	9.6	19.2
	RT	42	80.8	80.8	100.0
	Total	52	100.0	100.0	

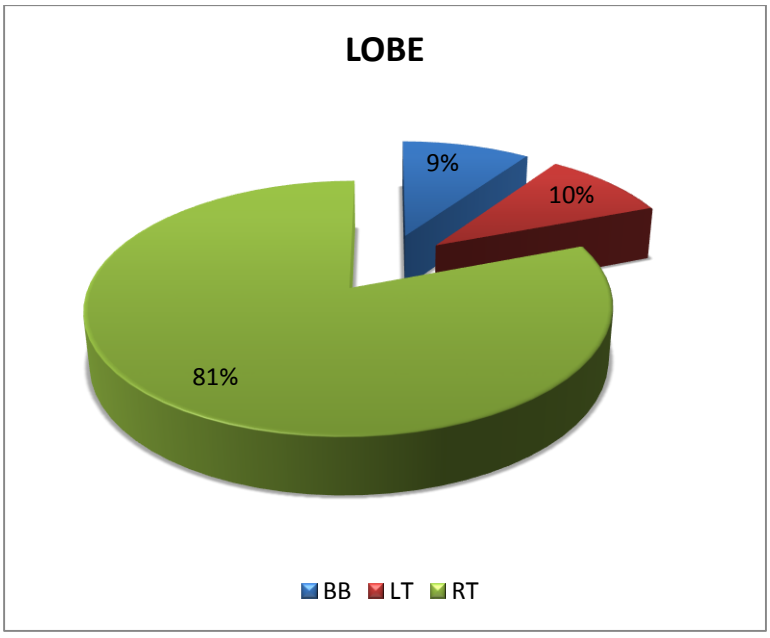


Table – 6

ABSCESS – SINGLE OR MULTIPLE

ABSCESS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	30	57.7	57.7	57.7
	Multiple	22	42.3	42.3	100.0
	Total	52	100.0	100.0	

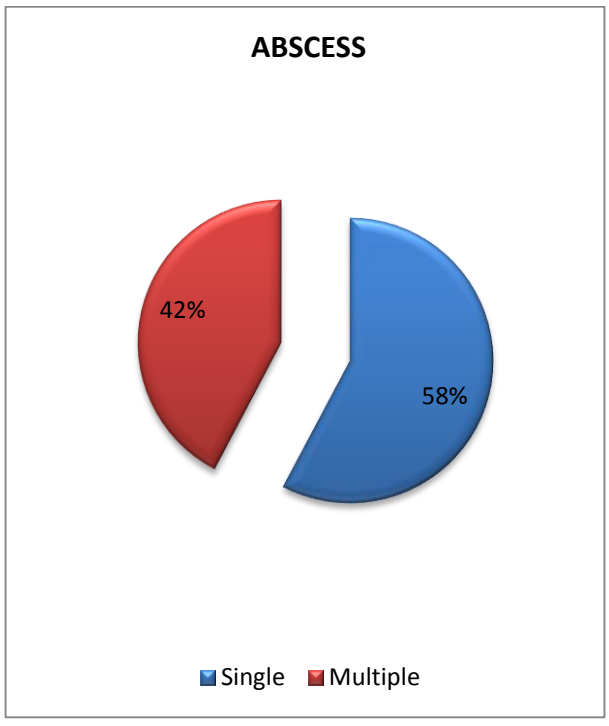


Table – 7

SIZE OF CAVITY

SIZE OF CAVITY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valids	< 5 cm	14	26.9	26.9	26.9
	5 - 10 cm	29	55.8	55.8	82.7
	10 - 15 cm	9	17.3	17.3	100.0
	Total	52	100.0	100.0	

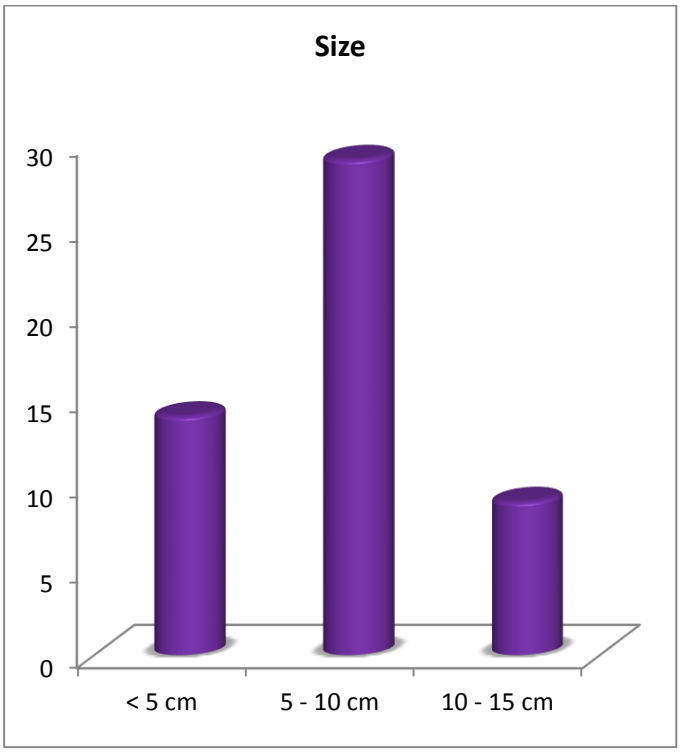


Table - 8

TIME FOR 50% REDUCTION IN ABSCESS CAVITY

			AMOEBIC		
			NO	YES	Total
TIME FOR 50% REDUCTION	1 - 5 days	Count	5	6	11
		% of Total	9.6%	11.5%	21.2%
	5 - 7 days	Count	4	10	14
		% of Total	7.7%	19.2%	26.9%
	7 - 10 days	Count	2	16	18
		% of Total	3.8%	30.8%	34.6%
	10 - 15 days	Count	3	6	9
		% of Total	5.8%	11.5%	17.3%
Total		Count	14	38	52
		% of Total	26.9%	73.1%	100.0%

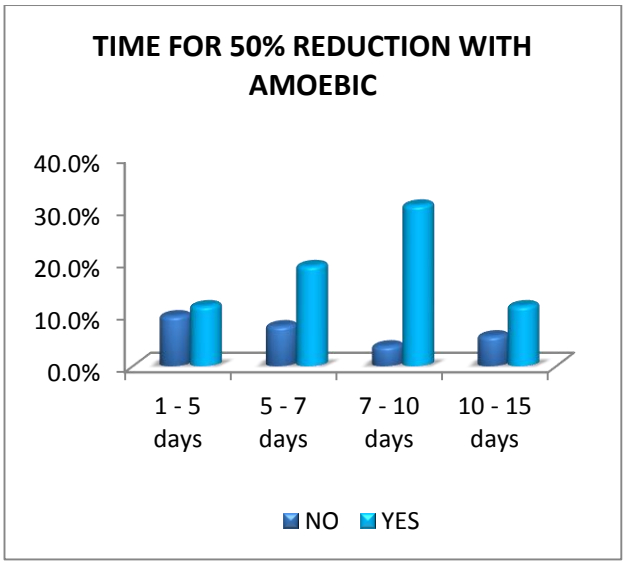


Table – 9

SECONDARY PROCEDURE

SECONDARY PROCEDURE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	47	90.4	90.4	90.4
	YES	5	9.6	9.6	100.0
	Total	52	100.0	100.0	

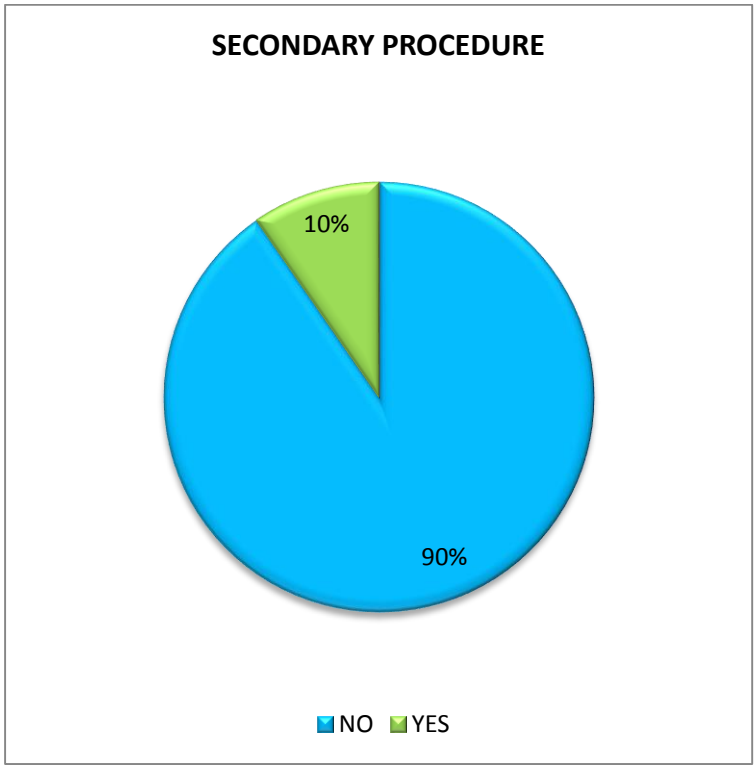


Table – 10

FOLLOW UP

FOLLOW UP					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	100% resolution	18	34.6	34.6	34.6
	80% resolution	34	65.4	65.4	100.0
	Total	52	100.0	100.0	

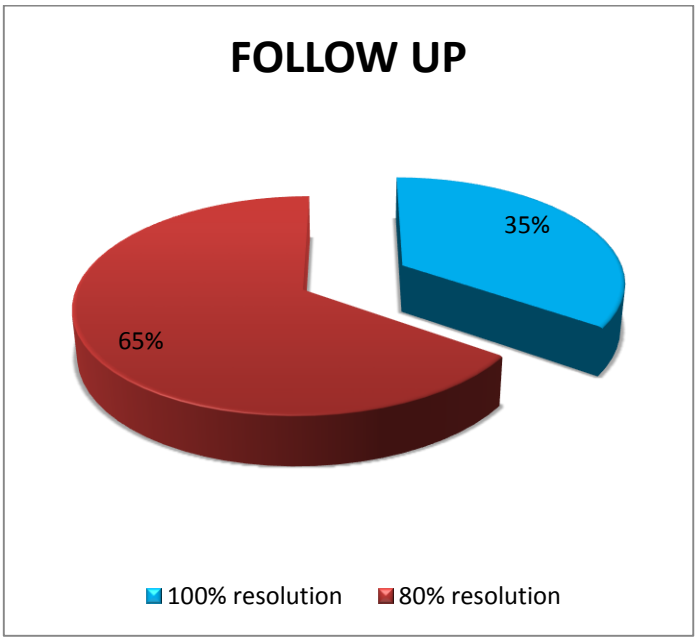
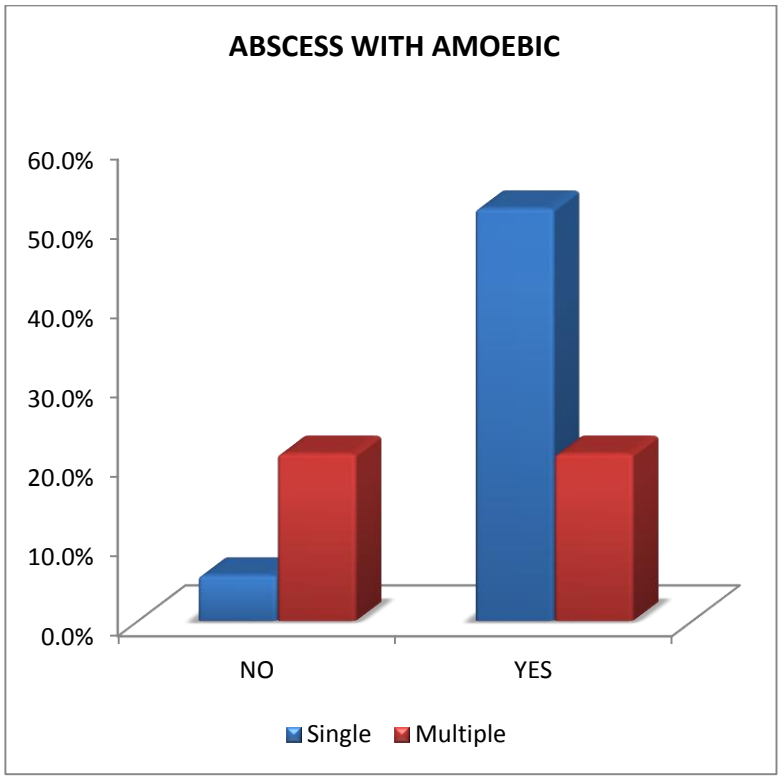


Table – 11

SINGLE/MULTIPLE VS AMOEBIC / PYOGENIC

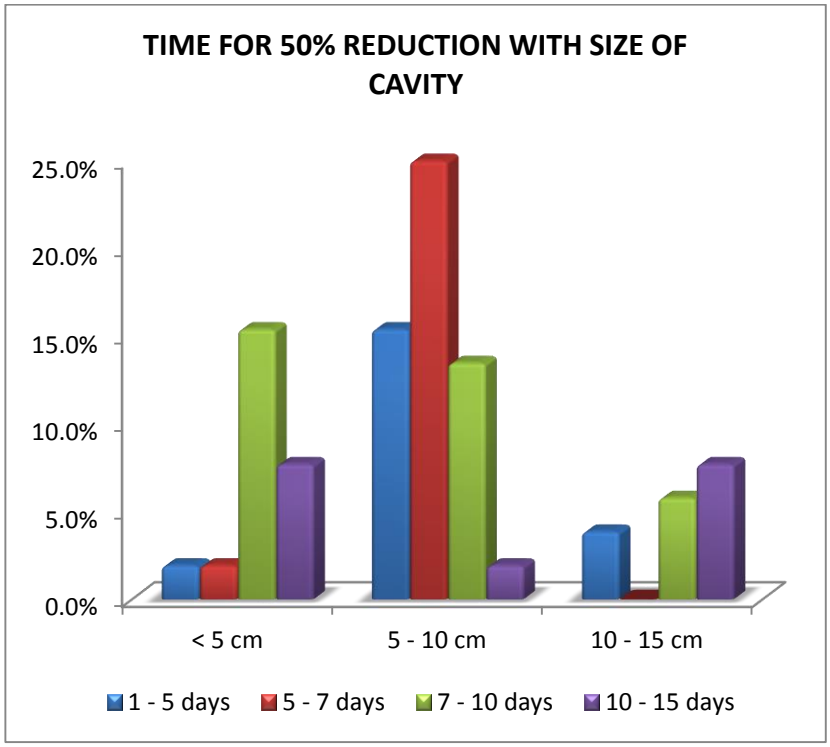


Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.322[a]	1	.001		
Continuity Correction[b]	8.389	1	.004		
Likelihood Ratio	10.576	1	.001		
Fisher's Exact Test				.003	.002
N of Valid Cases	52				

P - Value	Highly Significant at P ≤ .01

Table – 12

TIME FOR 50% REDUCTION VS CAVITY SIZE

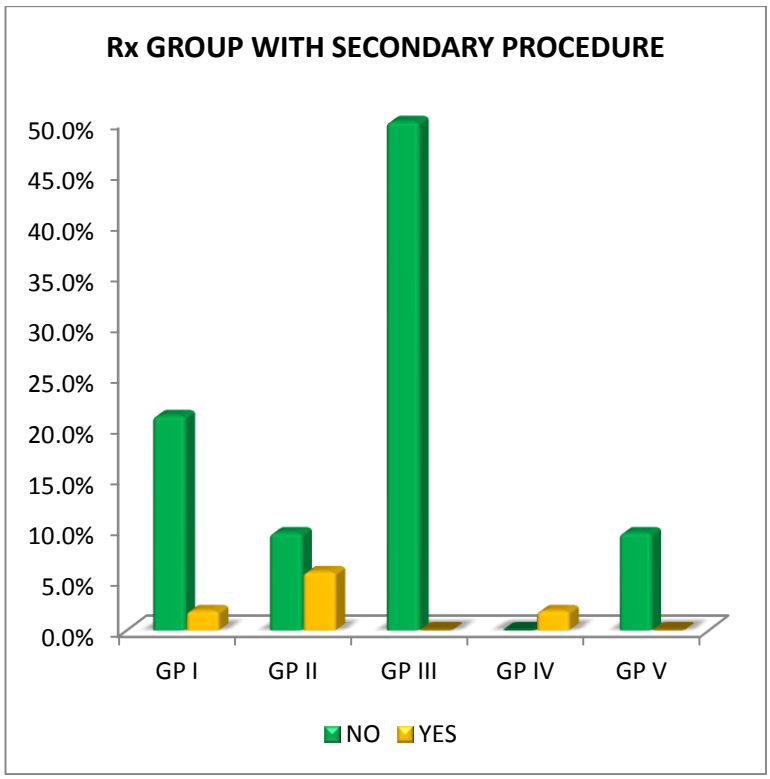


Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.832[a]	6	.002
Likelihood Ratio	23.950	6	.001
Linear-by-Linear Association	.553	1	.457
N of Valid Cases	52		

P – Value	Highly Significant at P ≤ .01

Table - 13

RX GP WITH SECONDARY PROCEDURE

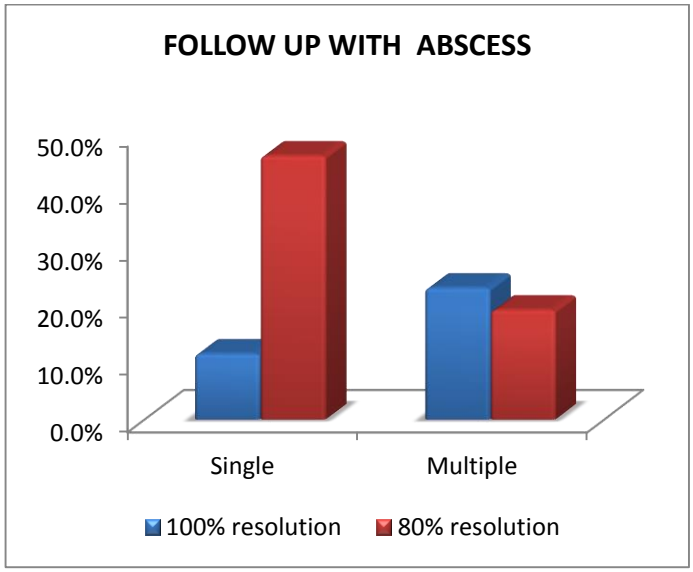


Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.878[a]	4	.001
Likelihood Ratio	15.452	4	.004
N of Valid Cases	52		

P – Value	Highly Significant at P ≤ .01

Table – 14

SINGLE / MULTIPLE ABSCESS VS FOLLOW UP

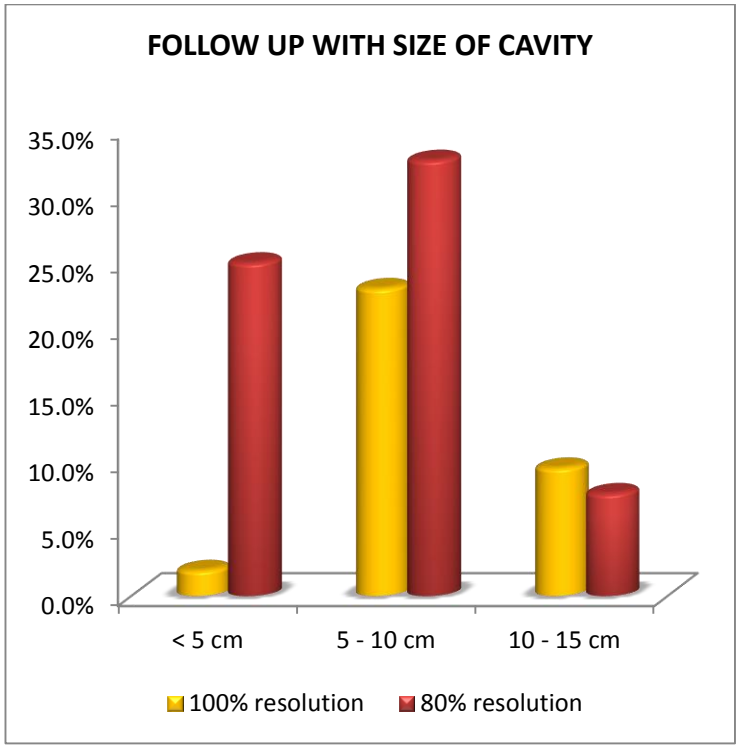


Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.692[a]	1	.010		
Continuity Correction[b]	5.253	1	.022		
Likelihood Ratio	6.743	1	.009		
Fisher's Exact Test				.017	.011
Linear-by-Linear Association	6.564	1	.010		
N of Valid Cases	52				

P – Value	Highly Significant at P ≤ .01

Table - 15

FOLLOW UP WITH CAVITY SIZE



Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.998[a]	2	.030
Likelihood Ratio	8.177	2	.017
Linear-by-Linear Association	6.320	1	.012
N of Valid Cases	52		

P – Value	Significant at P ≤ .05

Analysis of the Results

ANALYSIS OF THE RESULTS

TYPE OF THE LIVER ABSCESS:

In our study, among 52 patients included of them 73% of the patients (38) are amoebic liver abscess and 23% of the patients (14) are belongs to Pyogenic liver abscess. The P value is significant (< 0.001)

This is correlated with other studies (5, 23)

AGE DISTRIBUTION:

In our study, most of the patients are within 30- 40 yrs of age. amoebic liver abscess are within age group 30 to 50 years. Most of the pyogenic liver abscess patients are above 50 years of age group

This study correlates with other studies (6)

SEX DISTRIBUTION:

In our study, 48 of them are male patients. Only 4 of them are females. Most of the male patients are of amoebic liver abscess.

SITE OF THE LIVER ABSCESS:

In our study, about 42 patients the liver abscess was found in the right lobe of the liver, in five patients in the left lobe of the liver and in five patient in both lobes of the liver. It is also correlating with other studies (7, 8)

SYMPTOMS :

In our study, Fever is 100% (all patients) and 85% (44 patients), abdominal pain is 86% (45patients) and 93% (48 patients) of the patients in pyogenic liver abscess and amoebic liver abscess respectively.

This study correlates with other studies and shows abdominal pain is common in amoebic abscess and fever is common in pyogenic abscess.

SIGNS:

In our study, tenderness is 89% (46 patients) and 68 (35 patients), jaundice is 8% (4 patients) and 16% (8 patients), hepatomegaly is 67% (35 patients) and 50% (26 patients) in amoebic and pyogenic liver abscess respectively.

This correlates with other studies and shows tenderness & hepatomegaly is common in amoebic while jaundice is common in pyogenic liver abscess.(8)

SINGLE OR MULIPLE ABSCESS:

In our study, 30 patients (58%) are of single abscess. 22 (42%) of them are pyogenic abscess. Among, single abscess, majority of them are amoebic which is about 27 (90%) patients . Only 3 (10%) of them are pyogenic. Among multiple abscess, equal distribution seen between amoebic & pyogenic.

This correlates with other studies shows that majority of single abscess are amoebic in nature.

SIZE OF CAVITY:

Among 52 patients, 29 (56%) of them are of size 5-10 cm. 14 patients (27%) are < 5 cm of size. 9 patients (17%) are of 10-15 cm size.

TREATMENT MODALITIES:

Five modes of treatments are available. In our study, about 12 patients are in group I they treated by drugs alone. 8 patients in group II, are treated by ultrasound guided needle aspiration with drugs. In group III, about 26 patients are treated with percutaneous catheter drainage method. In group IV, about 1 patient treated with laparoscopic drainage method. In group V, about 5 patients are treated with open surgical drainage method.

DURATION OF DRAINAGE:

Among treatment modalities, pigtail catheter drainage accounts for about minimum of 8- 10 days. It increases in case of complications. In laparotomy & laproscopic drainage it accounts for slightly earlier duration about 5-7 days.

50% REDUCTION OF THE ABSCESS CAVITY:

In our study, In group II among 8 patients, 6 of them reduction seen in 5-7 days, but secondary procedure is more in this group. In group IV & V majority of them are within 1-5 days except in case of complications. In group III, majority of them are in 5-7 days.

Overall, duration of 50% reduction among all groups is about 7-10 days.

DURATION OF HOSPITAL STAY:

In our study, most of the patients (19) treated with pigtail catheter drainage method had 7-10 days hospital stay. Most of the patients (6) treated with ultrasound guided aspiration had hospital stay varies from 10-12 days. For laparotomy, hospital stay varies from 10 - 15 days, which is slightly higher compared to other groups.

This study correlates with other studies (11,12)

SECONDARY PROCEDURE DONE:

In our study about 8 patients in group II, 3 of them undergone secondary procedure like repeat needle aspiration & pigtail drainage. In group I, one patient had secondary procedure. No patients was undergone secondary procedure in pig tail catheter method.

It correlates with other studies.

COMPLICATIONS:

In our study, Infection was seen in 12% (6) of patients. Haemorrhage seen in 2% (4) of patients. Rupture seen in 4% (8) of patients.

Infection mainly seen in Gp III (2 patients) & Gp V (3 patients).

Haemorrhage seen in Gp III (2 patients).

Rupture seen in Gp II & Gp III (1 patient each)

This study correlates with other studies (13)

FOLLOW UP :

In our study nearly 100% resolution seen in only 18 patients (35%). 80% Resolution seen in patients 34 patients (65%).

Among group V, all of them are having nearly 100% resolution. In group III , 80% resolution (17 patients) and 100% resolution (9% patients). In group II, majority of them are in 80% resolution rate.

Discussion

DISCUSSION

Fifty two cases of liver abscess were randomly selected for the study in the year between Februry 2016 to September 2016 in Government Stanley hospital, Chennai regarding their age, sex, type of the abscess, symptoms, signs, treatment modalities, reduction of the abscess cavity more than 50% in days, duration of hospital stay, secondary procedure required, complications and resolution rate and are studied.

TYPE OF THE ABSCESS :

Worldwide the most common type of liver abscess is due to amoebiasis called amoebic liver abscess. In developed western countries, the common etiology for liver abscess is due to bacteria called pyogenic liver abscess. Still in India and also in other developing countries amoebic liver abscess is common. Also in temperate climate countries where the sanitation is poor and overcrowded area and unhygienic practices are followed this amoebic liver abscess is commonly present. In developed countries where the sanitation is good there is less chance for amoebic liver abscess. Fungal and tuberculous diseases are also causing liver abscess. But no case was reported in our study.

In comparing with other studies our study also conclude that amoebic liver abscess is common type in India.(5,23)

AGE DISTRIBUTION :

Amoebic abscess is due to the parasite E.Histolytica where the infective form cyst is present in the contaminated water causing amoebiasis. It becomes invasive disease, when the liver gives area for seeding. In India, most of the young individuals are affected between the age group 30 years to fifty years those who are alcoholic and living in overcrowded area with poor sanitation. Alcohol causes hepatocellular damage and make a nidus for infection.

Instead, the older individuals more than sixty years of age group are commonly affected by pyogenic liver abscess mainly due to biliary tract disease. In earlier days, it was due to appendicitis leads to portal pyemia and liver abscess.

In comparing with other studies (8) regarding age distribution of the liver abscess the amoebic liver abscess common in younger age group and pyogenic abscess common in elder age group. It correlates with our study.

SEX RATIO :

When comparing females, most of the males are consuming alcohol. So, the alcohol induced liver damage is common in male population leads to the increased incidence of amoebic liver abscess in men in India. The Amoebic abscess is seven to ten times common in men than in women.

But there is equal incidence in both males and females in case of pyogenic liver abscess.

In our study in amoebic liver abscess commonly affecting the males. It correlates with other studies (5,23)

SITE OF THE LIVER ABSCESS :

Because of large volume and the increased blood flow to the right lobe of the liver the infection seeding occurs most commonly in the right lobe of the liver. Most of the study says that the right lobe is commonly involved. Our study (7,8) also correlates.

In our study, for all the cases ultrasonogram was done where the abscess was found commonly in the right lobe in most of the cases.

SYMPTOMS:

ABDOMINAL PAIN:

The pain in the right hypochondrial region is due to stretching of the liver capsule by the abscess cavity. If the abscess is large enough to stretch the capsule may cause pain and if it is smaller the pain is uncommon. In case of right lobe liver abscess the pain was referred to right shoulder. In case of left lobe abscess the pain was referred to epigastriun or to the precardiac region.

In our study most of the liver abscess in the right lobe of the liver and most of the patients with pain in the right hypochondrial region. When comparing with other studies our study is correlated.(5,8)

FEVER:

In comparison with amoebic liver abscess, pyogenic liver abscess has slightly higher incidence of fever. In our study all the cases of pyogenic liver abscess are having fever whereas in amoebic liver abscess 85% of the patients are found to have fever.

This is also correlating with our studies(5,8)

SIGNS:

TENDERNESS:

The right hypochondrial tenderness is frequently associated with liver abscess particularly in amoebic liver abscess. Inter costal tenderness can be elicited in many patients. In our study most of the amoebic liver abscess patients are associated with tenderness.

This result is also correlating with other studies.(8)

JAUNDICE:

This is common in patients with pyogenic liver abscess because the biliary tract disease is the most common etiology. This is due to compression of the common bile duct by multiple abscess or large abscess.

Mild jaundice is seen in case of amoebic liver abscess.

HEPATOMEGALY :

If the abscess size is larger, the liver is palpable clinically. Ultrasound can also identify the hepatomegaly and abcess size. Most of the patients with amoebic liver abscess having hepatomegaly. Sometimes the pyogenic liver abscess show hepatomegaly.

INVESTIGATIONS

Blood haemoglobin, Blood sugar, White blood cell count, Liver function test are done routinely for all the patients included in the study. Increased alkaline phosphatase, increased bilirubin and decreased albumin levels are seen in patients with amoebic liver abscess. Anemia was seen in half of the patients in the study group. The leukocytosis was observed in three fourth of the patients in both groups.

Chest X-ray PA view was taken to all the patients.

Ultrasound abdomen was done to all the patients to know the size, number, location of the abscess cavity and rupture of the abscess and intra abdominal pathology. CT Scan was required for four of our patients, included in the study.

TREATMENT MODALITIES:

In our study, for all the patients ultrasonogram was done. The location, size, site of the abscess cavity was identified. The patients included in the study was divided in to five groups.

The group I patients were treated with drugs alone and they have abscess size of less than five centimetres. The group V patients are treated by open surgical method followed by drugs. These patients are treated in emergency situations. Group II, Group III, Group IV patients are categorized based on the abscess size more than 5 centimetres and large abscess. These three group patients are compared because the three modalities of treatments like ultrasound guided needle aspiration, percutaneous catheter drainage, laparoscopic drainage methods can be applied to all these groups. So, in the following aspects these groups are studied

- More than Fifty percent reduction of the abscess cavity in how many days
- Duration of hospital stay
- Secondary procedure done or not
- Complications like (1) Infection (2) Hemorrhage (3) Rupture
- Resolution rate

MORE THAN 50% REDUCTION IN THE ABSCESS CAVITY:

In group II, for aspiration wide bore needles are used. In some instances pus may be thick so some amount of pus may be retained in the abscess cavity. In this situation, reduction of the abscess cavity may be delayed. This is identified by repeat ultrasound after 5 days of treatment. In group III and IV patients the abscess cavity is reduced earlier than the group II because there wide bore drains are used.

In percutaneous catheter drainage method and laparoscopic drainage methods large amount of pus can be drained in single aspiration so the reduction of the abscess cavity is higher. As there is continuous drainage of the pus the reduction and resolution of the abscess cavity is faster.

This is correlated to other studies when comparing with our studies. (9,10,11)

DURATION OF HOSPITAL STAY:

In group I, the patients are treated with intravenous antibiotics for 5 days in the hospital and discharged and oral antibiotics were given for one week and reviewed with ultrasound followed by decision was made whether further treatment is required or not. In group II patients, ultrasound guided aspiration was done followed by drugs are given. Then repeat ultrsonogram was done in 3-5days, followed by further treatment

was decided and post procedure hospital stay durations are recorded. In group V patients postoperative hospital day duration was longer due to the open surgical procedure, general anesthesia, wound infection, need for intravenous antibiotics.

Comparatively, in laparoscopic drainage method has the advantage of shorter duration of hospital stay due to early reduction of the abscess cavity. Recovery from the symptoms and signs in ultra sound guided aspiration and the time taken for reduction of the abscess cavity is longer. Also, need for secondary procedure is high in ultrasound guided aspiration. In percutaneous catheter drainage method hospital stay is slightly higher than laparoscopic method due to there may be missed abscess cavities and also infection rate is high. This study also correlates with other studies (11,12).

SECONDARY PROCEDURE DONE:

It is done for patients those who have residual cavity, and the recurrence of the disease. In our study most of the patients in group II were required secondary procedure due to thick pus in the abscess cavity, improper intake of antibiotics, and irregular follow up. One patient in conservative management was required secondary procedure due to residual cavity. No patient in group III required secondary procedure.

This also correlates with other studies (13).

COMPLICATIONS:

INFECTION:

Infection rate is higher in group V patients. Because the open surgical techniques are more prone for infection than any other procedures. Infection may be due to unsterile techniques and contamination of the surgical wound by the pus. In closed tube percutaneous catheter drainage method, peritoneal spillage of the pus may occur. In this method also infection rate is relatively higher in comparing group II and group IV patients. Due to the infection the duration of the hospital stay and the use antibiotics are increased.

HEMORRHAGE:

This complication is common in case of ultrasound guided aspiration and percutaneous catheter drainage methods due to direct visualisation is not there during the procedures. In laparoscopic and open drainage methods, direct visualisation is possible. Hemorrhage can occur in the abdominal wall or the abscess cavity.

RUPTURE:

This is rupture in to the peritoneal cavity during insertion of the drainage tube in to the abscess cavity. It may cause peritonitis.

RECOVERY RATE AND RESOLUTION TIME:

It is based on the patient's general condition, associated pathology in the biliary tree, size of the abscess, number of the abscess, treatment opted, postoperative care. If the patient in immune compromised like anaemia diabetes mellitus, patients on steroid therapy, patients on chemotherapy and patients with HIV infection the rate of the healing of the abscess may be delayed.

Associated biliary pathology delays the recovery due to ascending cholangitis, it presents as a nidus for infection. In case of amoebic liver abscess, intestinal amoebiasis should be treated also.

Treatment should be planned according to the size of the abscess, general condition the clinical presentation at the time of admission. Correct treatment option can increase the recovery rate markedly. After surgical drainage procedures appropriate antibiotics, adequate nutrition, other post operative care measures to minimise the infection can increase the recovery.

In our study early resolution is seen in the patients whom treated with laproscopic & laprotomy drainage procedures.

This is correlating with other studies (10,11,15,16).

Summary

SUMMARY

- In the 52 cases, 38 cases are having amoebic liver abscess and 12 patients are having pyogenic liver abscess.
- Amoebic liver abscess is commonly seen in the age group between 30-50 years and the pyogenic liver abscess commonly seen in the age group more than 50 years
- In amoebic liver abscess, males are commonly affected than the females. Most of them are single abscess cavity (52%)
- All the patients included in the study are belonging to low socioeconomic groups.(Jarumillinta et al 2002 WJE 2002)
- Right lobe abscess in 42 patients, left lobe abscess in 5 patients , both lobes abscess in 5 patients. (Rustagi et al AGE 2006)

- In amoebic liver abscess 85.7% patients are having abdominal pain. It is higher than pyogenic liver abscess. Fever is seen all the patients of pyogenic liver abscess.
- Tenderness and hepatomegaly is common in amoebic liver abscess and jaundice is common in pyogenic liver abscess patients
- < 5cm abscess the treatment is drugs alone. Metronidazole for amoebic abscess and antimicrobials for pyogenic abscess.
- >5cm abscess - ultrasound guided aspiration, percutaneous catheter drainage, laparoscopic drainage method, laparotomy.

- 26 Patients were undergone pigtail procedure (50%)
- Among abscess cavity, single abscess(30 patients) more than multiple. Most of the single abscess cavity belongs to amoebic type
- Among cavity size 5-10 cms is more common (29 patients).
- Time taken for 50% reduction of cavity size commonly falls between 7-10 days.
- Only 10 patients undergone secondary procedure
- Only 65% patients achieve almost complete remission by 6 weeks follow up.
- Among size of cavity, < 5cm take longer time for 50%reduction compared to 5-10 cm since intervention is carried out.

- In pigtail drainage method 50% reduction of the abscess cavity seen in most of the patients with in 5-7 days, in needle aspiration similar reduction but secondary procedure is more
- The duration of hospital stay is 7-10 days in percutaneous catheter drainage, 10- 12 days in needle aspiration method.
- Two third of the patients required secondary procedure in ultrasound guided needle aspiration.
- Conservative line of treatment – 100% resolution of abscess cavity is less.

Conclusion

CONCLUSION

In case of abscess size is less than 5 cm, drugs alone is enough.

If the abscess size is more than 5 cm and large abscess without complications any one of the following method of treatment options may be carried out

1. Ultrasound guided needle aspiration with drugs
2. Percutaneous catheter drainage method with drugs
3. Laparoscopic drainage method with drugs

- Among these, pig tail drainage is most common procedure carried out in our institution. Except for increased hospital stay, being simple & effective, it remains the gold standard treatment of choice currently.
- In selected cases, Laproscopic drainage may be an effective alternative for large abscess with strong walls, multiple chambers which cannot be fully drained.

  Sample size is inadequate for interpretation in my study.
- If the abscess has ruptured with peritonitis, open surgical method is best method.

Annexure

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Ethical Committee Approval

Proforma

"A Comprehensive study on various treatment modalities & its outcome in liver abscess in our institution"

PROFORMA

NAME: AGE : SEX:

OCCUPATION: IP.NO: DOA:

SOCIOECONOMIC STATUS:

PRESENT HISTORY :

ABDOMINAL PAIN

FEVER

NAUSEA & VOMITING

DIARROHEA

JAUNDICE

PAST HISTORY:

PERSONAL HISTORY :

ALCOHOLISM

SMOKING

GENERAL EXAMINATION :

PALLOR

JAUNDICE

TEMPERATURE

PER ABDOMINAL EXAMINATION :

GUARDING & RIGIDITY

RIGHT HYPOCHONDRIAL TENDERNESS

INTERCOSTAL TENDERNESS

HEPATOMEGALY

INVESTIGATIONS :

BLOOD :

HAEMOGLOBIN

SERUM BILIRUBIN

SERUM ALBUMIN

SGOT

SGPT

ALP

PUS C/S :

STOOL FOR OVA / CYST :

CHEST-X-RAY :

ULTRASONOGRAM:

SITE OF THE ABSCESS

SIZE OF THE ABSCESS

NUMBER OF THE ABSCESS

CT SCAN :

TREATMENT MODALITIES :

CONSERVATIVE

USG GUDED NEEDLE ASPIRATION

PIGTAIL CATHETER DRAINAGE

LAPROSCOPIC DRAINAGE

LAPROTOMY

OUTCOMES :

CLINICAL IMPROVEMENT

DURATION OF DRAINAGE

TIME FOR 50% REDUCTION OF ABSCESS CAVITY

DURATION OF HOSPITAL STAY

SECONDARY PROCEDURE

COMPLICATIONS

RECURRENCE

FOLLOW UP

DATE OF DISCHARGE :

Consent Form

GOVT.STANLEY MEDICAL COLLEGE, CHENNAI- 1.

INFORMED CONSENT

DISSERTATION TOPIC:

"**A Comprehensive study on various treatment modalities & its outcome in liver abscess in our institution**"

PLACE OF STUDY: GOVT. STANLEY MEDICAL COLLEGE, CHENNAI
NAME AND ADDRESS OF PATIENT:

I, _____ have been informed about the details of the study in my own language.

I have completely understood the details of the study.

I am aware of the possible risks and benefits, while taking part in the study.

I understand that I can withdraw from the study at any point of time and even then, I will continue to receive the medical treatment as usual.

I understand that I will not get any payment for taking part in this study.

I will not object if the results of this study are getting published in any medical journal, provided my personal identity is not revealed.

I know what I am supposed to do by taking part in this study and I assure that I would extend my full co-operation for this study.

Name and Address of the volunteer : Signature of investigator :

Signature/Thumb impression of the Volunteer
Witnesses: (Signature, Name & Address) Date:

அரசு.ஸ்டான்லி மருத்துவ கல்லூரி, சென்னை – 1

"A Comprehensive study on various treatment modalities & its outcome in liver abscess in our institution"

நான் இந்த ஆராய்ச்சியில் விவரங்களை முற்றிலும் புரிந்துகொண்டேன்.

ஆய்வில் பங்கு எடுத்துபோது, சாத்தியமான அபாயங்கள் மற்றும் பயன்களை பற்றி நான் அறிந்துள்ளேன்.

நான் எந்தவொருவேளையிலும் ஆய்வில் இருந்து திரும்பமுடியும. அதன்பின்னர், நான் வழக்கம் போல் மருத்துவ சிகிச்சை பெற முடியும் என்று புரிந்து கொள்கிறேன்

நான் ஆய்வில் பங்கு எடுத்து பணம் எதையும் பெறமுடியாது என்று அறிந்துள்ளேன்.

இந்த ஆய்வின் முடிவுகள் எந்த மெடிக்கல் ஜர்னலில் வெளியிடப்பட இருந்தால் நான் எதிர்க்கவில்லை, என் தனிப்பட்ட அடையாளத்தை வெளிப்படுத்தப்பட்டு இருக்ககூடாது.

நான் இந்த ஆய்வில் பங்கெடுப்பதன் மூலம் நான் என்ன செய்ய போகிறேன் என்று தெரியும்

நான் இந்த ஆய்வில் என் முழுஒத்துழைப்பையும் கொடுப்பேன் என்று உறுதியளிக்கிறேன்.

தன்னார்வளர்	சாட்சி
பெயர் மற்றும் முகவரி	பெயர் மற்றும் முகவரி
கையொப்பம் / விரல்ரேகை:	கையொப்பம் / விரல்ரேகை:

ஆராய்ச்சியாளராக கையொப்பம் மற்றும் தேதி